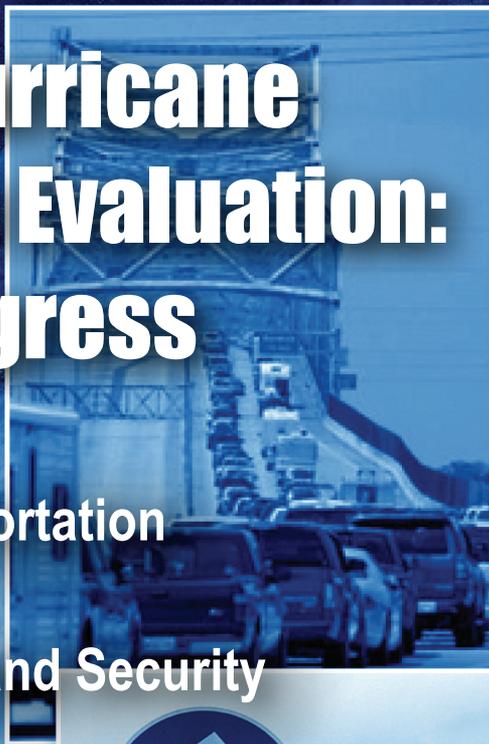


# Catastrophic Hurricane Evacuation Plan Evaluation: A Report to Congress

U.S. Department of Transportation  
in cooperation with the  
U.S. Department of Homeland Security

June 1, 2006





# **Report to Congress on Catastrophic Hurricane Evacuation Plan Evaluation**

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## List of Acronyms

### A

AASHTO	American Association of State Highway Transportation Officials
AAR	Association of American Railroads
ABA	American Bus Association
ADPS	Alabama Department of Public Safety
AEMA	Alabama Emergency Management Agency
ALDOT	Alabama's Department of Transportation
APTA	American Public Transportation Association
ARC	American Red Cross
ATA	American Trucking Associations
ATIS	Advanced Traveler Information Systems

### B

BNSF	Burlington Northern Santa Fe Railway
------	--------------------------------------

### C

CATS	Consequence Assessment Tool Set
CBRNE	Chemical, Biological, Radiological, Nuclear, or Explosive
CEMP	Comprehensive Emergency Management Plan
CEO	Chief Executive Officer
CERT	Community Emergency Response Team
CMC	Crisis Management Center
CTGP	Competitive Training Grant Program

**D**

DHS	Department of Homeland Security
DMS	Dynamic Message Sign
DOD	Department of Defense
DOH	Department of Health
DSCA	Defense Support of Civil Authorities
DTRA	Defense Threat Reduction Agency

**E**

EC	Emergency Coordinators
ELT	Evacuation Liaison Team
EMAC	Emergency Management Assistance Compact
EMAP	Emergency Management Accreditation Program
EMPG	Emergency Management Performance Grant
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPI	Emergency Public Information
ERC	Emergency Response Center
ESARVHP	Emergency System for Advanced Registration of Volunteer Health Professionals
ESF	Emergency Support Functions
ETC	Emergency Transportation Center
ETIS	Evacuation Traffic Information System
ETO	Emergency Transportation Operations

**F**

FAA	Federal Aviation Administration
FCO	Federal Coordinating Officer
FDEM	Florida Division of Emergency Management
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FRC	Federal Resource Coordinator
FRP	Federal Response Plan
FTA	Federal Transit Administration

**G**

GAO	Government Accountability Office
GIS	Geographic Information System

**H**

HAZUS-MH	Hazards US Multi-Hazards
HCM	Highway Capacity Manual
HES	Hurricane Evacuation Studies
HELP	Hierarchical Evacuation Level Planning
HHS	Department of Health and Human Services
HSC	Homeland Security Council
HSEEP	Homeland Security Exercise and Evaluation Program

HSGP	Homeland Security Grant Program
HSOC	Homeland Security Operations Center
HSPD	Homeland Security Presidential Decision Directive
HSPD 5	Homeland Security Presidential Decision Directive – Domestic Incident Management
HSPD 8	Homeland Security Presidential Decision Directive – National Preparedness
HSAS	Homeland Security Advisory System
HSPTAP	Homeland Security Preparedness Technical Assistance Program
HURREVAC	Hurricane Evacuation Model

**I**

IAEM	International Association of Emergency Managers
ICC	Interstate Commerce Commission
ICM	Intelligence Consequence Management
ICP	Incident Command Post
ICS	Incident Command Structure
IIMG	Interagency Incident Management Group
ITS	Intelligent Transportation Systems

**J**

JACE	Joint Assessment of Catastrophic Events
JFO	Joint Field Office
JPO	Joint Program Office

**K**

**L**

LPN Licensed Practical Nurse

**M**

MARAD U.S. Maritime Administration

MASSVAC Mass Evacuation Model

MEMA Mississippi Emergency Management Agency

MDOH Mississippi Department of Health

MDOT Mississippi Department of Transportation

MREs Meals Ready-To-Eat

MDSS Maintenance Decision Support System

MTA Metropolitan Transportation Authority

MCC Multi-agency Coordination Center

**N**

NCD National Council on Disabilities

NDMS National Disaster Medical System

NEMA National Emergency Management Association

NETVAC Network Emergency Evacuation Model

NFPA National Fire Protection Association

NFPA 1600 National Fire Protection Association 1600 – Standard on  
Disaster/Emergency Management and Business Continuity Programs

NGOs Non-Governmental Organizations

NHC National Hurricane Center

NIMS National Incident Management System

NOAA National Oceanic & Atmospheric Administration

NRC	Nuclear Regulatory Commission
NRCC	National Response Coordination Center
NRP	National Response Plan
NWS	National Weather Service
NVOAD	National Voluntary Organizations Active in Disaster
<b>O</b>	
OEM	Office of Emergency Management
OEMS	Office of Emergency Services
OREMS	Oak Ridge Evacuation Modeling System
OST	Office of the Secretary
OST/S-60	Office of Intelligence, Security, and Emergency Response
<b>P</b>	
PFO	Principal Federal Officer
POC	Point of Contact
<b>R</b>	
RETCO	Regional Emergency Transportation Coordinator
RETREP	Regional Emergency Transportation Representative
RN	Registered Nurse
ROC	Regional Operations Center
RRCC	Regional Response Coordination Center
RRF	Ready Reserve Force
RRT	Regional Response Team
RUCS	Regional Unified Command Structure

**S**

S-60	Office of Intelligence, Security, and Emergency Response
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCO	State Coordinating Officer
SEOC	State Emergency Operations Center
SERT	State Emergency Response Team
SFLEO	Senior Federal Law Enforcement Official
SFO	Senior Federal Official
SLG 101	State and Local Guide 101
SLOSH Model	Sea, Lake, and Overland Surges from Hurricanes Model
SOP	Standard Operating Procedure
STB	Surface Transportation Board

**T**

TCL	Target Capabilities List
TMC	Transportation Management Centers
TRAC	Terrebonne Parish Readiness and Assistance Coalition
TRB	Transportation Research Board
TTF	Texas Task Force

**U**

USACE	U.S. Army Corps of Engineers
U.S. DOT	U.S. Department of Transportation
UNC-CH	University of North Carolina-Chapel Hill

USNORTHCOM	U.S. Northern Command
USTRANSCOM	U.S. Transportation Command
UTL	Universal Task List
<b>V</b>	
VA	Department of Veteran Affairs
VMS	Variable Message Sign
<b>W</b>	
<b>X</b>	
<b>Y</b>	
<b>Z</b>	

# Catastrophic Hurricane Evacuation Plan Evaluation

*A catastrophic incident is defined as “Any natural or manmade incident, including terrorism, that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions. A catastrophic event could result in sustained national impacts over a prolonged period of time; almost immediately exceeds resources normally available to State, local, tribal, and private-sector authorities in the impacted area; and significantly interrupts governmental operations and emergency services to such an extent that national security could be threatened. All catastrophic events are Incidents of National Significance.”*

*National Response Plan<sup>1</sup>*

## Executive Summary

The U.S. Congress requested the U.S. Department of Transportation (DOT), in cooperation with the U.S. Department of Homeland Security (DHS), to “review and assess Federal and State evacuation plans (including the costs of the plans) for catastrophic hurricanes and other catastrophic events impacting the Gulf Coast region and report its findings and recommendations to Congress.” In Section 10204 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (P.L. 109-59) and Section 187 of the FY 2006 Department of Transportation Appropriations Act (P.L. 109-115), Congress specified that this assessment should include: (1) all safe and practical modes of transportation available for evacuations; (2) the extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions; (3) methods of communicating evacuation plans and preparing citizens in advance of evacuations; (4) methods of coordinating communication with evacuees during plan execution; (5) the availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes; (6) the time required to evacuate under the plan; and (7) the physical and mental strains associated with the evacuation. The assessment also includes issues and lessons learned from evacuations associated with Hurricanes Katrina and Rita and other recent hurricanes.

*“The Secretary [of Transportation] and the Secretary of Homeland Security, in coordination with the Gulf Coast States and contiguous States, shall jointly review and assess Federal and State evacuation plans (including the cost of the plans) for catastrophic hurricanes and other catastrophic events impacting the Gulf Coast region and report its findings and recommendations to Congress.”*

Section 10204 SAFETEA-LU and  
FY 2006 DOT Appropriations Act

This U.S. DOT study of evacuation plans for the Gulf Coast region has been closely coordinated with a DHS study of emergency operations plans in States, territories, and 75 major urban areas

called for by President George W. Bush,<sup>2</sup> the Homeland Security Council report, *The Federal Response to Hurricane Katrina: Lessons Learned*,<sup>3</sup> and Conference Report (H.Rept. 109-241) to the Department of Homeland Security Fiscal Year 2006 Appropriations Act (P.L. 109-90).<sup>4</sup> The U.S. DOT study focuses more attention on the evacuation component of emergency operations planning, and is limited to the Gulf Coast region.

## Methodology

The U.S. DOT developed a systematic, analytical process to evaluate the readiness and adequacy of State and local jurisdictions evacuation plans. The methodology included identifying the major components of a comprehensive evacuation planning and implementation program, collecting current practices and information on evacuations, developing criteria to assess current plans, conducting on-site discussions with State and local emergency management officials, and identifying lessons learned and best practices from recent evacuations. The assessment criteria were developed from current Federal guidelines on evacuations; the issues identified in SAFETEA-LU and the FY 2006 DOT Appropriations Act; recent government reports on Hurricanes Katrina and Rita; and additional issues identified by U.S. DOT.

Evacuation plans for all 5 Gulf Coast States—Alabama, Florida, Louisiana, Mississippi, and Texas—and a sample of 58 counties and parishes in each State were assessed based on how well they address the following seven key elements of evacuation planning and implementation:

1. Decision making and management
2. Evacuation planning
3. Public communications and preparedness
4. Evacuation of people with special needs
5. Evacuation operations for all modes of transportation
6. Evacuation-related sheltering considerations
7. Training and exercises.

To augment the review of evacuation plans, the U.S. DOT conducted meetings with State and local officials responsible for evacuations in the Gulf Coast States to clarify information in the plans, learn about plan updates that are anticipated, discuss constraints that State and local agencies face in planning for and conducting evacuations, and solicit recommendations on how evacuation capabilities could be improved. Discussions were also held with representatives of the bus, railroad, and airline industries as well as the American Association of State Highway and Transportation Officials (AASHTO), the American Red Cross, and other stakeholder groups to obtain their perspectives on actions that would improve evacuation capabilities.

## Summary of Major Findings

Table ES-1 summarizes the overall assessment of State and local evacuation plans with respect to the key elements of evacuation planning and implementation. The table shows that evacuation plans in the Gulf Coast States generally reflect current guidance contained in the Federal

Emergency Management Agency’s (FEMA’s) 1996 *Guide for All-Hazard Emergency Operations Planning* commonly known as *State and Local Guide (SLG) 101*.

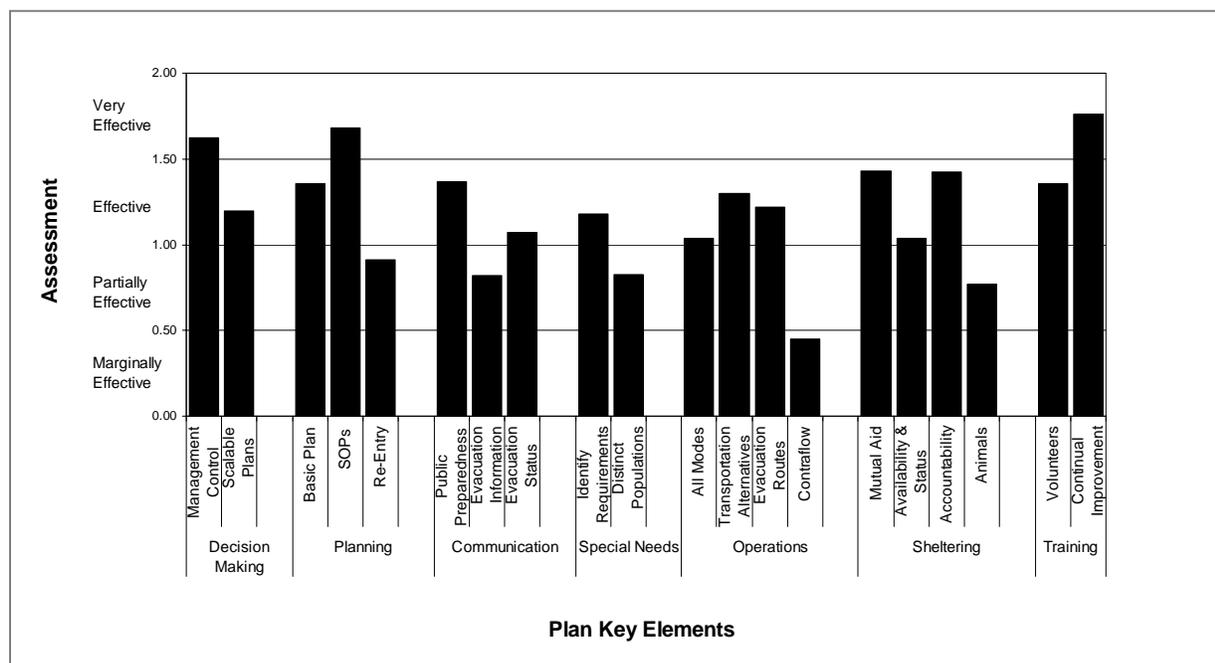
" Catastrophic events are, by their nature, difficult to imagine and to adequately plan for, and the existing plans and training proved inadequate in Katrina."

U.S. Senate Committee on Homeland Security and Governmental Affairs, April 2006.

## Decision Making and Management

Most State and local evacuation plans have adequate decision making and management structures for evacuations associated with non-catastrophic incidents. However, many of these plans do not adequately address requirements for decision making and management of mass evacuations associated with catastrophic incidents. There are several reasons for this. First, existing guidance does not provide sufficient technical assistance on how to manage evacuations associated with catastrophic incidents. Second, few multi-State exercises have been conducted until recently to test the decision making and management structure against requirements for catastrophic incidents. State and local agencies have not had the benefits of these exercises to refine their decision making and management processes based on lessons learned from them.

**Table ES-1: Status of Evacuation Plans in the Gulf Coast Region**



## Planning

Generally, the planning components of State and local evacuation plans were rated effective in terms of how well they met existing planning guidelines. As shown in Table ES-1, plans were

strong in requiring the development of standard operating procedures for agencies involved in evacuations, and adequately covered general evacuation planning considerations including hazards that could require a large-scale evacuation, the communities that should be evacuated under different conditions, the number of people and vehicles to be evacuated, decision points for an evacuation, the estimated time needed to complete the evacuation, and the distance evacuees must travel to ensure their safety. Plans were weaker in terms of provisions for returning evacuees to their homes.

While many State and local plans include contingencies and are scalable to reflect evacuation requirements for different intensity hurricanes, plans generally do not assume evacuations on the scale of those required for Hurricane Katrina. The demands associated with a catastrophe such as Hurricane Katrina are simply beyond the scenarios upon which the plans are based. Many States in the Gulf Coast region and elsewhere are in the process of updating their evacuation plans based on lessons learned from evacuations associated with Hurricanes Katrina and Rita and other recent hurricanes. In particular, State and local officials are reviewing provisions for obtaining outside transportation services to augment local resources and the coordination of plans with neighboring States and jurisdictions. They are also reviewing their existing mutual aid agreements which are formal agreements among emergency responders to lend assistance across jurisdictional boundaries when needed. These updates should improve State and local ability to manage mass evacuation needs related to catastrophic incidents.

Having a good plan, however, is no guarantee that evacuations will be carried out smoothly, particularly mass evacuations that involve many different agencies at all levels of government. Joint exercises at the regional level in which plans are tested against different scenarios are important ways that officials from different agencies can become accustomed to working together and can assess how their plans address different contingencies. As noted, States seldom conduct the kind of regional exercise that would be required to test some of the requirements that were faced during Hurricane Katrina. The multi-State regional tabletop exercises that DHS is conducting to prepare for the 2006 hurricane season should help to strengthen the decision making and management elements of local, State, and Federal plans, as well as identify weaknesses in specific plan elements that can be corrected.

In the Gulf Coast region, there is some **coordination of evacuation plans with adjoining jurisdictions**, but the coordination is inadequate for catastrophes on the scale of Hurricane Katrina. Most States have mutual-aid agreements and belong to the Emergency Management Assistance Compact (EMAC). EMAC is a legal agreement among member States that outlines the procedures, including reimbursement and liability issues, for providing assistance to other member States in the event of an emergency or disaster. However, mass evacuations place tremendous demands on transportation and sheltering systems that overwhelm the capacity of adjacent States. The Gulf Coast States have attempted to coordinate contraflow plans with neighboring States that may be affected, but exercises, traffic simulations, and other analyses to evaluate evacuation options for catastrophic incidents on the scale of Hurricane Katrina have not been conducted.

## Public Communication and Preparedness

Good communications with the public is one of the most important elements of an evacuation. This includes both communicating information to prepare citizens to evacuate and communicating with evacuees during the course of an evacuation. As shown in Table ES-1, most State and local evacuation plans have adequate provisions for communicating basic information to residents about when they should evacuate, the designated evacuation routes, what they should take with them, the location of shelters, and other information needed before they evacuate.

State and local governments use a variety of **methods of communications to inform residents before an evacuation begins**. These methods include television, radio, the Internet, telephone, and a variety of other methods. Not everyone regularly listens to media outlets or has access to all of these means of communications. This situation is especially true for those with the greatest need for specialized information. Several Gulf Coast States provide evacuation-related information in Spanish for their Spanish-speaking residents and New Orleans provides information and conducts classes in Vietnamese. These programs are excellent for providing general evacuation-related information, but plans are not as well developed for providing real-time information to persons with limited English proficiency about who should evacuate, when they should evacuate, and any changes that may have been made in plans for evacuation by public transportation. Few States, counties, or parishes have special programs to provide information to people with visual or hearing impairments, the homeless, or other special needs groups that are difficult to reach through normal communications channels. One good practice is that all of the televised hurricane briefings in Florida from the State Emergency Operations Center also include a sign language interpreter as part of the briefings.

Methods for communicating evacuation options by modes other than personal vehicles are not well developed in most cases. A number of jurisdictions indicate locations where public transportation may be obtained, but many have no specific services identified to assist persons in getting to those designated locations. This situation is a particular problem for people with various disabilities.

Methods of **communicating with evacuees during plan execution** are not as well developed as are plans for communicating prior to an evacuation and need to be improved in most jurisdictions. Communications are essential to provide information on the availability of hotels, shelters, food, fuel, and medical and other essential services along evacuation routes; traffic conditions on alternative evacuation routes; the location of shelters that will accept pets and that are equipped to handle people with various special needs; the identities of those being evacuated on public transportation; and where those persons are being taken.

Methods of communicating information prior to an evacuation may not be available during an evacuation. Evacuees typically will not have access to the Internet or to television—two of the primary means of providing pre-evacuation information. Radio may be available to those in cars and those who have battery-operated radios. Many States position dynamic message signs along evacuation routes. State personnel staff rest areas, truck weigh stations, welcome centers, and service plazas to provide information to evacuees en route. Motorist information services such

as the 511 telephone system Florida has deployed or highway advisory radio can provide route-specific information. However, to get real-time traffic information on evacuation routes, traffic monitoring equipment is required. That equipment is not widely deployed in most rural areas along the Gulf Coast, except in Florida, which has an extensive statewide traffic monitoring system.

Effective communications before a catastrophic incident can play an important role in convincing residents that they should evacuate. During an evacuation, effective communications will enhance the efficiency of the system and also reduce the associated **mental and physical strains**. People must leave most of their possessions and the security of their homes, often with little knowledge of where they will stay or for how long. The more information that can be provided to residents about the availability of shelters, what they can take, provisions for accommodating pets and service animals, security that will be provided while they are away from their homes, and other factors of concern, the less stress there will be. Technical assistance and other information is available for some of these special requirements, but additional work is required to develop a comprehensive resource describing the special needs of different groups.

## **Evacuation of People with Special Needs**

Plans in the Gulf Coast region for evacuating persons with various special needs generally are not well developed. Hospitals, nursing homes, prisons, and other institutions generally are responsible for developing their own evacuation plans and deciding when to evacuate their residents. They face unique issues such as whether the risks of not evacuating outweigh the risks of moving seriously ill individuals. Widely reported stories about the breakdown of these plans during the 2005 hurricane season at certain institutions highlight the need to ensure responsible individuals have access to the latest information about a catastrophic incident and that institutions' evacuation plans will work in the event of a mass evacuation of the entire population of an area.

Evacuating those with special needs who are not in institutions also presents problems that are not well addressed in most State and local plans. Locating where these individuals live often is difficult, despite attempts by local agencies to maintain lists of persons with various special needs. New Orleans, for instance, is establishing a 311 information hotline to register residents with special needs for evacuations. Other areas in the region have similar registration programs, but those programs are only as good as the willingness of persons to register. Privacy interests and some individuals' reluctance to identify themselves as having special needs are considerations that must be addressed in establishing a comprehensive registry.

Persons who use wheelchairs, those who rely on special medical equipment, those with hearing or visual impairments, the elderly, and other groups all have unique communication, transportation, and sheltering needs that must be planned for in advance. This includes ensuring that all forms of temporary housing (e.g., shelters, trailers, etc.) meet Americans with Disabilities Act guidelines. Providing these specialized services in the course of a mass evacuation presents particular challenges. Provisions to meet transportation and sheltering requirements of these various special needs groups must be improved in most evacuation plans.

## Evacuation Operations

The actual operation of transportation systems throughout the course of catastrophic incidents is one of the most important parts of the evacuation process. For known or imminent incidents such as hurricanes, State and local operations plans in the Gulf Coast region are generally adequate for highway evacuations, although there are significant differences in the extent to which certain issues are covered. Almost all jurisdictions do a good job in terms of designating highway evacuation routes and directing evacuees in private vehicles to those routes. Plans are less robust for monitoring traffic on evacuation routes and providing real-time operational information to emergency managers, upon which they can make decisions concerning those routes.

Understanding **the time required for evacuations** is essential for all those who must evacuate to do so safely. A number of evacuation planning and operations models have been developed by Federal agencies and are available to State and local agencies. FEMA, the United States Army Corps of Engineers (USACE), and the National Oceanic & Atmospheric Administration (NOAA) conduct hurricane evacuation studies for the Gulf Coast and other States to help State and local emergency managers decide who should evacuate during a hurricane threat and when the evacuation order should be given based on the estimated time to evacuate a certain number of persons from a given location. Many emergency managers rely on the information in these studies, but some States reported that they sometimes forgo study updates because their 25-percent share of the cost of the study is a constraint. If outdated studies are used, the times required to evacuate may not take into account new development, highway improvements that have been made and other changes that have occurred. While hurricane evacuation studies do consider people with special needs, they often do not provide all of the information that would be desirable on the time needed to evacuate various special needs populations.

An important lesson learned in evacuations associated with Hurricanes Katrina and Rita was the necessity of having **food, water, restrooms, fuel, and shelter opportunities along evacuation routes**. State and local plans generally recognize the need to have these services prepositioned and available along evacuation routes. However, plans for providing real-time information on the availability and location of these services are not as well developed.

All States in the region have a plan for contraflow operations on certain limited access evacuation routes, but county plans often do not address those contraflow plans. This failure to integrate State and local activities in these contraflow plans is the primary reason why overall plans are rated low in terms of contraflow operations.

While State and local evacuation operations plans were generally rated as adequate, most need improvement with respect to the **role of all safe and practical modes of transportation**. In rural areas, the only alternative to the automobile that may be mentioned in evacuation plans is the school bus, but some State officials noted that their school buses are in poor condition and not capable of making long highway trips. Plans may provide information on who to contact to mobilize those buses, but few details typically are given on how those vehicles will be used, the availability of drivers to operate those vehicles, or the bus routes or staging areas to collect evacuees.

Even in urban areas where more modes are available, few plans recognize the potential role for intercity buses, trains, airplanes, and boats. These modes may be particularly important for persons who cannot evacuate in personal vehicles including persons with various disabilities, the elderly who cannot or prefer not to drive, low-income households that do not own automobiles, and those who are incarcerated or are in other institutions such as nursing homes or hospitals. Transportation needs associated with each of these groups may differ, but few plans address these specific needs.

With advanced planning, school buses and local transit buses can be mobilized by local jurisdictions with little advanced notice; commercial vehicles such as intercity buses, trains, airplanes, and boats require more advanced notice. Memoranda of Understanding (MOU) or other such formal agreements with owners and operators of these vehicles are the best way to be sure they will be available if needed. Several States, including Texas, have contracted for buses to be available for mass evacuations. The potential need to provide national or regional level coordination of the use of these other modes, especially aviation, must also be addressed. Amtrak has developed a generic MOU to provide evacuation services to jurisdictions. Care must be taken to ensure that agreements involving several jurisdictions and the same commercial carrier do not exceed the carrier's capacity.

Many other details must be considered when using commercial carriers from outside of the immediate area. These include ensuring that destinations where persons will be taken for each of these modes have been identified and confirmed; ensuring that interstate operating authority is in place or can quickly be obtained; and ensuring that everyone is aware of how to get to those modes, where they will be taken, limitations on what can be brought on board, and how they can return to their community once it is safe. Few State and local plans address these details.

Experiences in New Orleans in 2005 accentuated the need to include all modes of transportation in evacuation plans. New Orleans had a large segment of its population that could not evacuate in personal vehicles, and the City was unprepared to evacuate so many persons using other modes. Since Hurricane Katrina, however, the City has developed a plan for the use of multiple modes of transportation to evacuate those who cannot evacuate by private vehicle. This plan identifies target groups that will be evacuated by bus, railroad, and airplane, and how persons from each of these target groups will be transported to those modes. In addition, the City has enhanced their sheltering plan and will provide more information to citizens early in the season. One goal of the plan is to "create and maintain an environment where the decision to evacuate becomes more desirable than remaining behind."

## **Sheltering**

Sheltering is one of the most important considerations when planning evacuations. Table ES-1 shows that, in general, State and local plans adequately address sheltering. However, while Gulf Coast evacuation plans generally do a good job of identifying shelter locations in their State, most do not mention specific provisions for monitoring the status of those shelters and providing real-time information on the availability of space. The plans generally do not contain information on shelters in other States. Neither do they have plans for providing information on the availability of rooms at hotels, motels, and other private facilities where evacuees may want to

stay. The availability of such information would significantly improve the efficiency of evacuations and reduce evacuees' stress.

All States along the Gulf Coast are members of the EMAC and have mutual-aid agreements with other member States, including agreements to accommodate evacuees. They recognize that if any sizeable number of persons must be evacuated, their own shelter capacity may be insufficient and they will have to rely on shelters in adjacent jurisdictions. Many State and local governments rely on local chapters of the American Red Cross and other volunteer organizations to set up, staff, and operate shelters. The American Red Cross and DHS/FEMA are the lead agencies for Emergency Support Function (ESF) 6, Mass Care, which covers sheltering activities. Other States, such as Alabama, are assuming more of the responsibility themselves, although they continue to work with the American Red Cross.

Accommodating pets at shelters is a significant issue. The American Red Cross indicates that it generally cannot accept pets in shelters because of State health and safety regulations, although they do accept service animals. Many States are in the process of reevaluating these regulations and more latitude in accommodating pets can be expected in the future. Guidelines will have to be developed to ensure that public health and safety are not compromised when accommodating pets at public shelters.

## **Training and Exercises**

Most State and local evacuation plans contain provisions for training and conducting exercises to test their plans that are generally adequate for most evacuations. Few, however, contain provisions for conducting multi-State exercises involving officials from other States, the Federal government, and other organizations with evacuation responsibilities to test the adequacy of plans for catastrophic incidents. This lack of regional exercises prior to Hurricanes Katrina and Rita contributed to some of the problems encountered during those evacuations. There now is a much greater recognition of the importance of regional exercises, and as noted above, the DHS is sponsoring a series of regional exercises that will provide an opportunity for officials from different States to work together with Federal agencies to evaluate their plans, identify weaknesses, and develop strategies for meeting the needs of future catastrophic incidents.

## **Costs to Develop and Update Plans**

The costs to develop and update plans varies based on the population, the geography and surge areas, the number of potential evacuation routes to be analyzed, the demographics of the area (e.g., large populations of people with low income or large numbers of people with special needs), the number of neighboring jurisdictions to coordinate with, and other factors. In addition to costs to develop and update plans, State and local agencies incur costs to exercise those plans on a regular basis.

Very little data is available on the costs of evacuation plans and the limited cost information received for this study is incomplete. State officials noted that determining the amount of funding allocated and spent for evacuation planning would be difficult since funding comes from

many sources at the Federal, State, and local level, and many agencies within the various levels of government have agencies involved in evacuation planning.

The States do not appear to budget specific amounts for evacuation planning, but include these costs within broader emergency management programs. While State officials reported evacuation plans are executed with current funding, they felt that funding was constrained. The officials did not identify what activities were constrained, and constraints were not discernible from the data as there is no accounting of budgeted versus actual costs for evacuation plans.

## Activities to Prepare for the 2006 Hurricane Season

As noted above, Federal, State, and local officials recognize the need to be better prepared for the 2006 hurricane season than they were for the 2005 season. All of the States and some of the local jurisdictions in the Gulf Coast region have reviewed their evacuation and overall emergency operations plans and many made changes to address lessons learned last year. For example, on March 21, Governor Perry of Texas signed an Executive Order that, among other things, calls for development of a statewide hurricane evacuation and shelter plan, a separate evacuation and shelter plan for people with special needs, contraflow plans for all major evacuation routes, a plan to ensure fuel availability along all evacuation routes, and a public awareness initiative. In addition to the regional tabletop exercises being conducted by DHS, States and several urban areas in the Gulf Coast region are conducting exercises to improve their preparedness for hurricanes.

The U.S. DOT has undertaken a number of initiatives to prepare for the 2006 hurricane season including: (1) improving coordination among those with transportation responsibilities associated with a catastrophic incident, (2) coordinating with the United States Army Corp of Engineers (USACE) and FEMA to improve communications capabilities, (3) examining current regulations that may affect the transportation industry's ability to respond to catastrophic incidents and developing procedures to remove or dramatically reduce impediments, (4) coordinating with transportation industry representatives, the American Red Cross, the Humane Society, and other stakeholders to improve evacuation capabilities based on lessons learned in 2005, and (5) conducting training and process improvements based on after-action reviews. Federal, State, and local agencies, transportation and shelter providers, and others involved in evacuations are now better prepared to handle the demands of a catastrophic hurricane or other catastrophic incident. The challenges of responding to an incident like Hurricane Katrina and the flooding that followed remain daunting, however, and many additional steps need to be taken before we can be confident that we are fully prepared to respond to another incident of similar proportions.

## Recommendations

Throughout the assessment of State and local evacuation plans, actions that could be taken to improve various aspects of evacuation planning and implementation are identified in the main

*"Hope for the best but prepare for the worst."*

*"Preparing for an event like Hurricane Katrina or any natural disaster, we should never feel like we are completely prepared. We can always do better."*

Robert R. Latham, Jr., Executive Director -  
Mississippi Emergency Management  
Agency, December 7, 2005.

report. Based on lessons learned from recent mass evacuations, State and local governments already are beginning to incorporate some of those improvements into their plans. Federal agencies also are in the process of examining how they can improve their response to catastrophic incidents that overwhelm State and local resources. Near-term actions that will improve overall capabilities to respond to hurricanes during the 2006 hurricane season include the regional exercises that DHS recently conducted in the Gulf Coast States, the U.S. DOT activities noted above, the many State and local actions that have been taken based on lessons learned during Hurricanes Katrina and Rita, and actions that transportation and shelter providers have already taken to enhance their capabilities.

The following are recommendations for ways to further improve mass evacuation planning and implementation capabilities that extend beyond what Federal, State, and local governments are already doing.

- 1. Develop regional plans for mass evacuations in connection with catastrophic incidents on the scale of Hurricane Katrina. These plans should be developed jointly by State and local officials within the region in cooperation with officials from appropriate Federal agencies; providers of all safe and practical modes of transportation and providers of shelters, food, fuel, and other necessities; managers of hospitals, nursing homes, emergency medical services (air, ground, etc.) jails, and other institutions with their own evacuation plans; and representatives of various special needs populations.**

This recommendation goes beyond the recommendation in the Homeland Security Council Report, *The Federal Response to Hurricane Katrina: Lessons Learned*. This report, which is the result of a comprehensive review of the Federal response to Hurricane Katrina directed by the President to identify changes needed to improve the Nation's preparedness to respond to natural and manmade disasters, recommends that individual State and local agencies should be required to have evacuation plans as a condition of receiving Homeland Security grants.

- 2. Regional exercises to test plans and decision making structures for different mass evacuation scenarios should be conducted on a regular basis to ensure that Federal, State, and local agencies are prepared to respond to different types of catastrophic incidents.**
- 3. Responsible Federal agencies should review the National Response Plan, FEMA's State and Local Guide 101, concepts of operations for the various Emergency Service Functions, and other appropriate planning guidance related to evacuations and update as needed to cover the special requirements of mass evacuations from incidents of Hurricane Katrina's magnitude.**

In particular, these guidance documents should be refined to more specifically recognize needs and challenges associated with coordinating the activities of multiple agencies representing different levels of government across a multi-State region of the country.

- 4. Transportation agencies and operators should be more directly involved in key aspects of evacuation planning and implementation.**

Transportation by all safe and practical modes is a key element of evacuations. Failure to include transportation agencies in the evacuation planning and operations can lead to inefficiencies and delays in evacuating citizens, especially those most in need of assistance. Including highway, rail, air, and other appropriate modes in planning and operations helps to ensure that required resources are identified, including those needed for mass evacuations, and that transportation is available to meet the unique needs of various special needs groups. It also helps to ensure that critical details such as the need for agreements on the destinations to which various modes will transport evacuees are considered.

**5. Responsible State and local agencies should develop and deploy systems to provide information to evacuees and emergency managers during the course of evacuations on the status of traffic, shelters, fuel, and other services along evacuation routes.**

Systems should be based on existing communications network and intelligent transportation systems (ITS) architecture and to the maximum extent possible should be incorporated into general purpose motorist information and traffic monitoring services used during normal traffic operations.

**6. State and local agencies should work with the special needs communities to develop systems whereby those requiring specialized transportation or sheltering services during evacuations can make those needs known to emergency managers and operators of transportation and sheltering services before evacuations.**

This information should be maintained in a way that can easily be updated and that recognizes privacy and other concerns of various special needs groups.

**7. Sheltering requirements for all segments of the population and evacuees by all modes of transportation should be more directly integrated into the evacuation planning process.**

Sheltering needs vary considerably for different groups of people and must be explicitly recognized in evacuation plans. There are significant issues regarding accommodation of pets at shelters that need to be resolved.

DHS is conducting a series of hurricane preparedness exercises in the Gulf Coast region to prepare for the 2006 hurricane season. The U.S. DOT and other Federal agencies are participating in these exercises. The Federal government should continue to organize and facilitate these types of regional exercises in high-priority areas to bring together local, State, and Federal agencies to integrate and test their plans and procedures.

The Homeland Security Council, the House of Representatives, the Senate, and the Government Accountability Office have all issued reports looking at various aspects of the Federal response to the catastrophic hurricanes that struck in 2005. These reports contain numerous recommendations on actions that could allow the Federal Government to work more effectively with State and local government in responding to future catastrophic incidents. Many of these recommendations touch on aspects of mass evacuations. The U.S. DOT, DHS, and other Federal agencies are reviewing these recommendations along with other internal and external assessments of responses to recent catastrophic incidents. In the meantime, special federal

assistance will be provided this year in areas that are still recovering from the 2005 hurricane season and which are at enhanced risk due to the damage experienced last year. The U.S. DOT, in coordination with DHS, stands ready to quickly make evacuation experts available to local and state governments that want to better understand their strengths and vulnerabilities in preparing for and implementing successful evacuations.

While many short-term actions have already been taken, other changes could require legislative changes. Potential longer-term changes are being carefully considered before any legislative proposals are sent forward. The U.S. DOT is examining a number of specific options that will enhance its ability to respond to evacuation needs associated with catastrophic incidents. In addition to activities noted above that have already been done to prepare for the 2006 hurricane season, the U.S. DOT is examining a range of potential longer-term options including ways to strengthen internal resources and processes to better respond to catastrophic incidents and ways to enhance the contribution of various U.S. DOT programs to improve State and local evacuation capabilities. Once decisions have been made on changes that would enhance the U.S. DOT's contribution to a coordinated Federal, State, and local response effort, as well as changes to improve State and local planning and operations capabilities, any required legislative proposals will be developed and sent to Congress.

## Chapter 1: Introduction

This report presents the results of an assessment of evacuation plans in the Gulf Coast region by the U.S. Department of Transportation (DOT). The study was conducted in response to a Congressional request to gather information on mass evacuations from catastrophic incidents. While local and State agencies nationwide handle evacuations of hundreds to thousands of people from wild fires, floods, tornadoes, or hazardous materials releases, catastrophic incidents such as hurricanes may necessitate the evacuation of hundreds of thousands of people. For example, more than 1.2 million people in Louisiana were evacuated before Hurricane Katrina's landfall, and still more than 100,000 people were evacuated from New Orleans in the week following the storm. Three weeks later, 1.8 million people in Texas were ordered to evacuate before Hurricane Rita made landfall. This study evaluated how well local and State plans meet current evacuation guidance, even if this guidance does not sufficiently address catastrophic incidents the size of Hurricanes Katrina and Rita.

### Congressional Requirements for the U.S. DOT Study

In Section 10204 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (P.L. 109-59) and Section 187 of the FY 2006 Department of Transportation Appropriations Act (P.L. 109-115), Congress tasked the U.S. DOT, in cooperation with the U.S. Department of Homeland Security (DHS), to "review and assess Federal and State evacuation plans (including the costs of the plans) for catastrophic hurricanes and other catastrophic events impacting the Gulf Coast Region and report its findings and recommendations to Congress."<sup>5</sup> Congress specifically requested that the assessment include the following factors:

1. All safe and practical modes of transportation available for evacuations;
2. The extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions;
3. Methods of communicating evacuation plans and preparing citizens in advance of evacuations;
4. Methods of coordinating communication with evacuees during plan execution;
5. The availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes;
6. The time required to evacuate under the plan;
7. The physical and mental strains associated with the evacuation; and
8. The cost of the plan.

In addition to these factors, the U.S. DOT assessed the extent to which current plans cover other factors needed to effectively plan and execute a mass evacuation including decision making and management; evacuation of persons who are transit-dependent, have various special needs, have

limited English proficiency, or have pets or service animals; and identification of shelter locations and destinations for evacuation by bus, train, airplane, or other modes. This report presents the results of the assessment of both the congressionally mandated factors and the additional U.S. DOT study criteria.

## Coordination with DHS Study on the Status of Catastrophic Planning

This assessment of evacuation plans for Gulf Coast States is a companion to the DHS study called for in the Conference Report on the Department of Homeland Security Fiscal Year 2006 Appropriations Act (H. Rept. 109-241). In that report, Congress directed the DHS to report on the status of catastrophic planning in all States and the 75 largest urban areas. The *Nationwide Plan Review: Phase I Report* was delivered to Congress on February 10, 2006, and details the findings of Phase I of the study based on self assessments submitted by States, territories, and urban areas. Phase II of the DHS study will report on the peer review visits by DHS teams to each of these areas to validate the self assessments and determine requirements for on-site planning assistance. U.S. DOT and DHS have consulted on the methodologies and visits of these two studies to build on and strengthen the results of each other.

## Background

Congress requested that this study focus on the critical issues surrounding mass evacuations associated with hurricanes and other catastrophic events in the Gulf Coast region. Previous mass evacuations have been implemented in connection with other hurricanes in the Gulf Coast region, but all paled in comparison to the evacuations associated with Hurricane Katrina in 2005. The 2005 hurricane season was the worst ever recorded in the Atlantic Basin. Seventeen new records were set, including the most named storms, the most hurricanes, and the most Category 5 hurricanes. Damage estimates were in excess of \$125 billion—more than twice the cost of any other hurricane season. Hurricane Katrina alone accounted for over \$80 billion—the highest loss ever recorded from a single storm.<sup>6</sup>

### Records set in the 2005 Hurricane Season include the totals for:

- ▶ **Name storms:** 27; previous record: 21 in 1933
- ▶ **Hurricanes:** 15; previous record: 12 in 1969
- ▶ **Major hurricanes hitting the U.S.:** Four (Dennis, Katrina, Rita and Wilma); previous record: Three, most recently in 2004
- ▶ **Hurricanes of Category 5 intensity:** Three (Katrina, Rita and Wilma); previous record: Two in 1960 and 1961

Not only has Hurricane Katrina become the most expensive natural disaster in U.S. history, it has also proven to be one of the deadliest. When it made landfall near the Louisiana-Mississippi border on the morning of August 29, 2005, it set in motion a series of events that exposed vast numbers of Americans to extraordinary suffering. From the marshes of Louisiana's Plaquemines Parish to the urban center of New Orleans, to the coastal communities of Mississippi and Alabama, Katrina cut an enormous swath of physical destruction, environmental devastation, and human suffering. Three weeks later, Hurricane Rita forced a similar series of events on the citizens of southwestern Louisiana and southeastern Texas.

Moreover, more severe hurricane seasons are predicted in the near future. The National Oceanic & Atmospheric Administration (NOAA) states that “the Atlantic Basin is in the active phase of a multi-decadal cycle in which optimal conditions in the ocean and atmosphere, including warmer-than-average sea-surface temperatures and low wind shear, enhance hurricane activity. This increase in the number and intensity of tropical storms and hurricanes can span multiple decades (approximately 20 to 30 years).”<sup>7</sup>

Local and State agencies routinely handle evacuations from wildfires, floods, tornadoes, and hazardous materials releases. A recent study by the U.S. Nuclear Regulatory Commission (NRC) estimated that a large-scale evacuation of 1,000 people or more occurs, on average, every three weeks nationwide. However, out of the total of 230 large-scale evacuations, the NRC study found that there were 14 evacuations of 100,000 people or more in a 12 ½-year period between January 1, 1990 and June 30, 2003. Of these large-scale evacuations, only two involved evacuations of more than one million people. The NRC study found that community familiarity with emergency alert procedures and door-to-door notification of impacted areas was very important to an effective evacuation. The study also found that a high level of coordination among agencies, an effective command structure, and training and evacuation exercises were also cited in the interviews as contributing to efficiency and effectiveness of the evacuation. In addition, cooperation from evacuees was repeatedly cited as contributing to safe, efficient, and effective evacuations.

This report details the assessment of local, State, and Federal plans for evacuations related to hurricanes and other catastrophic events in the Gulf Coast region. The assessment includes plans for moving people away from areas threatened by catastrophic events and providing critical food, water, and supplies for evacuees en route, as well as plans for providing shelter to evacuees from other areas. In addition to assessing current evacuation plans, the report summarizes lessons learned from and best practices in planning and conducting mass evacuations. This information should provide a valuable resource to State and local governments in the region and in other areas, many of whom currently are in the process of updating their emergency operations plans.

The report also summarizes current Federal guidance and assistance on evacuation planning and implementation. While the current guidance documents address evacuations, they do not specifically address different strategies and requirements for an *evacuation* versus a *mass evacuation from a catastrophic incident*. The Catastrophic Incident Annex of the National Response Plan (NRP) includes overall policies and a concept of operations, but does not provide guidance on mass evacuations from a catastrophic incident. The Annex states that normal procedures for ESFs may be streamlined or expedited to meet the requirements of a catastrophic event and gives examples in mass care, public health, medical care, casualties, and public information. Additional guidance is being developed in a Catastrophic Incident Supplement (CIS) to the NRP. Following Hurricane Katrina, President Bush ordered a comprehensive review of the Federal response to the hurricane by his Assistant for Homeland Security and Counterterrorism. The resulting report, as well as reports by the Government Accountability Office (GAO), the U.S. House of Representatives, and the U.S. Senate, assess the Federal response and make numerous recommendations that are already under consideration.

Based on information obtained during the course of the U.S. DOT study, this report includes recommendations on steps that can be taken at all levels of government to improve readiness and capabilities to evacuate persons in the event of hurricanes or other catastrophes.

## Study Scope and Methods

This study examined 63 evacuation plans for States, counties, parishes, and major urban areas within the Gulf Coast region. The study evaluated evacuation plans maintained by emergency management agencies as well as evacuation plans from other agencies and organizations with responsibility for various components of an evacuation including transportation agencies, state police, and other organizations involved in various aspects of evacuation and sheltering. Local plans were included in the analysis because local governments generally have the primary responsibility for initiating and managing evacuations. While State and Federal resources will be required for mass evacuations associated with catastrophic incidents, local governments have significant responsibilities during such evacuations.

Evacuation plans were not requested for all counties and parishes in Alabama, Louisiana, Mississippi, and Texas—rather, plans were requested only for those jurisdictions directly on the coast or one county or parish removed from the coast. These jurisdictions are most at risk from catastrophic hurricanes; therefore, the adequacy of their evacuation plans is particularly important. The U.S. DOT requested all county plans from the State of Florida because of its unique geography. While plans were not received from all of the counties and parishes, the U.S. DOT reviewed and assessed the majority of the plans and collected a wealth of information to support its findings and recommendations. Sheltering plans of States adjacent to the Gulf Coast States were also examined to determine whether and how those plans considered needs to shelter evacuees from the Gulf Coast States.

Detailed written evaluations of evacuation plans for States and local jurisdictions in the region were not prepared. Rather, evacuation plans were evaluated with the goal of assessing their effectiveness—specifically, how well they address key elements that are critical to successful evacuation planning and implementation. An important part of the evaluation was a visit to each State in the region to discuss plans in person with State and local officials responsible for developing and executing them. In addition to details about their plans, State and local officials were asked about constraints faced in creating and executing evacuation plans, costs to prepare and carry out plans, and actions that could be taken to improve their evacuation capabilities.

It is important to remember that this assessment of plans is a “snapshot in time.” With each hurricane or other catastrophic incident, new challenges arise and lessons are learned. These lessons are then folded into the next update of Federal, State, and local plans and the planning cycle continues. This assessment is based upon criteria that were predicated on Federal planning guidance in place prior to the 2005 hurricane season, and the plans reviewed were generally in compliance with that guidance. This guidance addresses evacuation, but not mass evacuation from a catastrophic incident. Our experiences during the 2005 hurricane season are evidence that there is a need to review and assess plans for addressing mass evacuations from catastrophic incidents.

Additionally, this assessment focused on the written contents of the evacuation plans and not on the effectiveness of their execution during catastrophic incidents. Therefore, it is important to recognize that findings from this assessment may not reflect results from other studies that were conducted to assess the response to past catastrophic incidents, particularly to Hurricanes Katrina and Rita.

This assessment focused solely on one aspect of emergency management—evacuations in the Gulf Coast region. Again, it is therefore important to recognize that the assessment findings may differ slightly from those of other studies that looked at emergency preparedness in whole, such as the companion DHS report, or other studies such as the NRC report that presented case studies on 50 specific evacuations from across the Nation that occurred before July 2003.

Best practices for evacuation planning were developed based on a review of existing literature, discussions with experts, and lessons learned from recent evacuations. These best practices serve as a benchmark both for evaluating existing State and local plans and for State and local agencies in updating their evacuation plans. The best practices consider the varying needs of evacuation relative to the area or type of catastrophe. The discussion of best practices for this report provides an overview of those factors that should be included in evacuation plans and considered in implementing emergency evacuations. This work will be expanded in another project by the Federal Highway Administration (FHWA). FHWA is developing a series of “primers” on evacuations that will provide more detailed guidance on good practices in planning and conducting all types of evacuations. The primers will be widely distributed to the many different entities involved in evacuation planning and implementation and will also serve as training material for a series of regional workshops designed to assist those engaged in evacuation planning.

## **Chapter 2: Federal, State, Local, and Transportation Roles in Evacuations**

### **Federal, State, and Local Roles in Evacuations**

This section provides information on the current government framework, laws, regulations, and guidance on mass evacuations. It includes an overview of the roles and responsibilities of local, State, and Federal agencies and non-governmental organizations (NGOs), and current guidance materials on evacuations.

The NRP defines a catastrophic event as any natural or manmade incident, including terrorism, that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions. A catastrophic event could result in sustained national impacts over a prolonged period of time; almost immediately exceeds resources normally available to State, local, tribal, and private-sector authorities in the impacted area; and significantly interrupts governmental operations and emergency services to such an extent that national security could be threatened.

State and local governments are the first line of emergency response in disasters. State and local governments have fire, police, emergency medical services (EMS) and emergency management agencies dedicated to disaster response. The recent White House report on the Federal response to Hurricane Katrina described the situation when normal emergency response to a disaster becomes a response to a catastrophic incident:

However, in some instances, the State and local governments will be overwhelmed beyond their ability to satisfy their traditional roles in this system. Indeed, in some instances, State and local governments and responders may become victims themselves, prohibiting their ability to identify, request, receive, or deliver assistance. This is the moment of catastrophic crisis—the moment when 911 calls are no longer answered; the moment when hurricane victims can no longer be timely evacuated or evacuees can no longer find shelter; the moment when police no longer patrol the streets, and the rule of law begins to break down.<sup>8</sup>

According to the NRP, an evacuation is an organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and includes their reception and care in safe areas. Initiating a mass evacuation may be one step in a comprehensive emergency response to a major disaster. Others steps could include, for example, activating emergency operations plans and establishing a unified area command; establishing communications; fire fighting, emergency medical services, and policing for public safety and security; implementing transportation and logistics plans to support the response and recovery as well as the evacuation; deploying urban search and rescue operations; establishing public health and medical services; establishing resource support; addressing agriculture, natural resources,

and hazardous materials and response needs; and initiating infrastructure assessment and repair and long-term community recovery and mitigation.

Evacuations can take many forms:

- *Spontaneous Evacuation.* Residents or citizens in the threatened areas observe an emergency event or receive unofficial word of an actual or perceived threat and, without receiving instructions to do so, elect to evacuate the area. Their movement, means, and direction of travel is unorganized and unsupervised.<sup>9</sup>
- *Voluntary Evacuation.* This is a warning to persons within a designated area that a threat to life and property exists or is likely to exist in the immediate future. Individuals issued such a warning or order are not required to evacuate; however, it would be to their advantage to do so.<sup>10</sup>
- *Mandatory or Directed Evacuation.* This is a warning to persons within the designated area that an imminent threat to life and property exists and individuals *must* evacuate in accordance with the instructions of local officials.<sup>11</sup>
- *Notice versus No-Notice Evacuation.* These evacuations are also in the context of either a notice evacuation where sufficient planning time exists to warn citizens and to effectively implement a plan, or a no-notice evacuation where circumstances require immediate implementation of contingency plans.
- *Shelter-in-Place.* Depending on the nature and timing of a catastrophe, emergency managers may warn people of whether it is safer to evacuate or to shelter in place. In an evacuation, people leave their homes and businesses and travel to a safe location away from danger. In some instances, it is safer for people to quickly seek shelter indoors—in homes, schools, businesses, or public buildings—than to try to travel. Shelter-in-place would be used when there is little time to react to an incident and it would be more dangerous to be outside trying to evacuate than to stay indoors for a short period of time. Additional protective actions that the emergency managers may recommend would include turning off air conditioners and ventilation systems and closing all windows and doors. Sheltering-in-place might be used, for example, in the event of a chemical accident. FEMA recommends people have food, water, and medical supplies and be prepared to stay indoors for at least three days<sup>12</sup>.

While this study examines evacuation lessons learned from hurricane evacuations in the Gulf Coast region, many of the findings, lessons learned, and best practices are applicable for other catastrophic incidents requiring mass evacuation. These include, for example, catastrophic earthquakes; terrorist acts, military attacks, and bombings; floods; fire; tsunamis; tornados; other civil disasters (e.g., chemical spills and industrial accidents); or major transportation accidents, including train or airplane crashes.

## National Policy Guidance

Since the tragic events of September 11, 2001, the Administration and Congress have taken unprecedented steps to enhance the Nation's emergency preparedness. The DHS was established to unify the vast national network of organizations and institutions involved in efforts to secure our Nation, and significant resources and assistance have been targeted toward State and local agencies with emergency management responsibilities. Other Federal agencies including the U.S. DOT also have long had key roles in responding to national disasters. To guide and integrate the work of the Federal agencies, the President issued a series of national policy statements called Homeland Security Presidential Directives (HSPDs). The HSPDs build on previous government and industry standards as well as the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) that has guided Federal support of State and local disaster response for more than 30 years. In addition, the HSPDs mandated the development of new national planning documents to provide a detailed framework for local, State, and Federal agencies to prepare and respond to major disasters and events, including mass evacuations. The Federal government's support and assistance for mass evacuations is provided under this framework of law, policies, and plans:

- **Stafford Act:** Under the Stafford Act, a Governor may request that the President declare an emergency or a major disaster. A Governor's request is based on "a finding that the disaster is of such severity and magnitude that effective response is beyond the capabilities of the State and the affected local governments and that Federal assistance is necessary."<sup>13</sup> Generally, the affected States share the costs of the Federal response
- **HSPD-5 Domestic Incident Management.** The purpose of this policy is to enhance the capability of all levels of government across the Nation to work together efficiently and effectively using a national approach to domestic incident management. The policy requires an "all hazards approach," which refers to preparedness for domestic terrorist attacks, major disasters, and other emergencies. Toward this end, HSPD-5 mandated DHS create two plans that define the specific requirements to ensure the necessary level of coordination—the National Incident Management System (NIMS) and the National Response Plan (NRP).
  - **NIMS** provides a consistent, nationwide approach for Federal, State, local, and tribal governments; the private sector; and NGOs to work together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among Federal, State, local, and tribal capabilities, NIMS includes a core set of concepts, principles, and terminology including the Incident Command Structure (ICS).
  - The **NRP** is an all-discipline, all-hazards plan that provides the structure and mechanisms to coordinate a Federal

The NRP and State and Local Plans All Use NIMS to Ensure a Common Approach to Planning and Operations



response. The NRP includes a series of Incident Annexes for specialized situations and an annex on Catastrophic Incidents. The NRP enhances preparedness by defining the roles of Federal, State, local, and tribal governments, as well as NGOs. Under the NRP, specific government and private sector capabilities are assigned responsibility for functional roles and responsibilities in Emergency Support Functions (ESFs). The ESFs and their primary agencies are shown in Table 2-1. The ESFs serve as the primary operational-level mechanism for Federal agencies to provide assistance to State, local, and tribal governments. Evacuation efforts by States and local governments would be supported under several ESFs including transportation, communication, mass care, and emergency management. The ESFs that support mass evacuation from a catastrophic incident are described in more detail later in this chapter in the section on, “U.S. DOT Roles, Programs, and Initiatives to Support Evacuations.”

**Table 2-1: Emergency Support Functions**

	<b>ESF</b>	<b>Primary Department or Agency</b>
<b>ESF-1</b>	Transportation	DOT
<b>ESF-2</b>	Communications	DHS (IAIP/NCS)
<b>ESF-3</b>	Public Works and Engineering	DOD (USACE) and DHS (FEMA)
<b>ESF-4</b>	Firefighting	USDA (Forest Service)
<b>ESF-5</b>	Emergency Management	DHS (FEMA)
<b>ESF-6</b>	Mass Care, Housing, and Human Services	DHS (FEMA) and American Red Cross
<b>ESF-7</b>	Resource Support	GSA
<b>ESF-8</b>	Public Health and Medical Services	HHS
<b>ESF-9</b>	Urban Search and Rescue	DHS (FEMA)
<b>ESF-10</b>	Oil and Hazardous Materials Response	EPA and DHS (U.S. Coast Guard)
<b>ESF-11</b>	Agriculture and Natural Resources	USDA and DOI
<b>ESF-12</b>	Energy	DOE
<b>ESF-13</b>	Public Safety and Security	DHS and DOJ
<b>ESF-14</b>	Long-Term Community Recovery and Mitigation	USDA, DOC, DHS (FEMA), HUD, Treas, and SBA
<b>ESF-15</b>	External Affairs	DHS (FEMA)

- **HSPD-8 National Preparedness.** This directive calls for DHS and other Federal agencies to develop specific goals and plans that establish measurable priorities, targets, standards for preparedness assessments and strategies, and a system for assessing the Nation’s overall level of preparedness. The directive identifies steps for improved coordination and support of local, State, and Federal government emergency response. With regard to evacuations, HSPD-8 defines first responders as “those individuals who in the early stages of an incident are responsible for the protection and preservation of life.” This includes emergency management and transportation agencies planning and executing an emergency evacuation as first responders.
  - **National Preparedness Guidance.** This guidance identifies the tasks and capabilities that local, State, and Federal agencies will need to respond to disasters. The guidance calls for “capabilities-based planning,” which focuses initiatives on providing specific capabilities to meet a wide range of threats and hazards. This guidance was based on tasks and capabilities identified for responding to 15 National Planning Scenarios ranging

from hurricanes and earthquakes to biological, chemical, and radiological events that represent plausible scenarios to identify the tasks and capabilities needed to respond to these events. Ten of the 15 scenarios include evacuation elements, and 6 include major evacuations of from 70,000 to 1 million people. These scenarios reflect a rigorous analytical effort by local, State, and Federal homeland security experts, and it is recognized that revisions will be needed over time to ensure the scenarios are accurate and representative.<sup>14</sup> For example, the maximum evacuation envisioned in these scenarios was 1 million people, while 1.2 million were evacuated for Hurricane Katrina in 2005.

- **Universal Task List (UTL) and Target Capabilities List (TCL).** In support of HSPD-8, the DHS collaborated with public- and private-sector stakeholders to develop two tools for improving domestic preparedness—the UTL and the TCL. The UTL defines the tasks that need to be performed at all levels of government to prevent, respond to, and recover from a range of possible major events. The UTL is a “task menu” that collectively represents critical tasks for preparing for and responding to hazards. Jurisdictions and agencies select the tasks that apply to their roles in specific homeland security missions and build and maintain the capabilities required to perform those tasks. The TCL is a list of the capabilities needed to perform the tasks defined by the UTL. It is a tool that can be used at all levels of government to define roles in national preparedness and inform decisions about capabilities needed to prepare for a range of hazards. This includes specific tasks and capabilities necessary for mass evacuations such as traffic and transportation plans; plans, policies, and procedures for people with special needs; and emergency operations center management, as well as related functions such as mass care, planning, information sharing and collaboration, and citizen preparedness. As a requirement of HSPD-8, the TCL establishes “measurable readiness targets ... that appropriately balance the potential threat and magnitude of terrorist attacks, major disasters, and other emergencies with the resources required to prevent, respond to, and recover from them.”<sup>15</sup>
- **National Preparedness Goal.** In compliance with HSPD-8, DHS, in coordination with other Federal departments and agencies, issued the Interim National Preparedness Goal in March, 2005 that sets forth a process for prioritizing Federal preparedness assistance (e.g. grants, training, exercises, planning) on the basis of risk and need to enhance their capabilities outlined in TCL in furtherance of national priorities.

## Evacuation Planning and Implementation Guidance

The DHS and FEMA, the National Fire Protection Association (NFPA), and the NRC have respectively developed best practice evacuation guidance and recommendation documents. While these evacuation guidance documents and standards are voluntary and not regulatory in origin, they are often incorporated into State and local laws and regulations because they are generally accepted as industry standards or as criteria for securing emergency management grant funding. For example, the DHS has stipulated that all State, local, and related organizations seeking FY 2006 homeland security grant funding must have performed a self assessment of their organization’s evacuation plans, utilizing one of the standards described below, and

participated in a peer review of their plans by former State and local emergency management and homeland security officials prior to receiving these funds.<sup>16</sup>

**SLG 101.** This guidance document from FEMA provides emergency management professionals and related emergency service personnel with FEMA’s concept for developing risk-based, all-hazard emergency operations plans (EOPs). The SLG 101 is meant to serve as a “toolbox” of ideas and to advise State and local emergency management professionals in their efforts to develop and maintain a viable, all-hazard EOP. It is intended primarily for use by personnel responsible for EOP development and maintenance in State and local emergency management agencies. Specifically, the SLG 101 “should help the State and local emergency management organizations produce EOPs that:

- Serve as the basis for effective response to any hazard that threatens the jurisdiction;
- Facilitate integration of mitigation into response and recovery activities; and
- Facilitate coordination with the Federal Government during catastrophic disaster situations that necessitate implementation of the Federal Response Plan (FRP).<sup>17</sup>

The SLG 101 “clarifies the preparedness, response, and short-term recovery planning elements that warrant inclusion in State and local EOPs.”<sup>18</sup> It offers best approaches and recommendations on how to deal with the entire planning process—from assembling a planning team to writing the plan. It also encourages emergency management professionals to address all of the hazards that threaten their jurisdiction in a single integrated EOP, instead of relying on stand-alone plans. With regard to evacuations, the SLG 101 has an integrated evacuation section (Attachment E: Evacuation) that provides detailed input on developing evacuation protocols within a State or local government EOP. In addition, sections on Mass Care and Hurricanes in SLG 101 provide detailed evacuation planning support. SLG 101 was published in September 1996, and DHS plans to update it to reflect the NRP. Recommended practices for evacuation planning and implementation are discussed in more detail in the next chapter and are among the bases for evaluating current State and local evacuation plans.

**NFPA 1600 Standard on Disaster/Emergency Management and Business Continuity Programs.** The NFPA 1600 is designed to be a description of the basic criteria for a comprehensive emergency management program that addresses disaster recovery, business continuity, and emergency management. NFPA standards are developed through a consensus standards development process approved by the American National Standards Institute. The NFPA develops standards that are regularly implemented by State and local lawmakers for building, life safety, and electrical standards.<sup>19</sup>

NFPA 1600 also provides limited guidance on evacuation planning and support in Section 5.14.2 “Crisis Communications and Public Information.” This section recommends that emergency management officials maintain a disaster and emergency public communications capability to communicate with the special needs population and protective action guidelines and recommendations to contend with shelter-in-place or evacuations. The NFPA also provides evacuation training and guidance material for the evacuation of people with disabilities and of health care facilities.

**Emergency Management Accreditation Program (EMAP).** EMAP is an independent association that publishes voluntary assessment and accreditation processes for State and local government emergency management programs. The EMAP Commission is the 10-member governing and decision-making body of EMAP. The members are appointed by the International Association of Emergency Managers (IAEM) and National Emergency Management Association (NEMA). The commission functions independently of those organizations and its Emergency Management Accreditation process is based on compliance with collaboratively developed national standards for emergency preparedness. These EMAP Standards are based on the NFPA 1600 discussed above. EMAP standards address key components of preparedness and response for a terrorist event or catastrophic disaster including multi-disciplinary coordination, continuity of operations and continuity of government planning, alternate operating facilities, and interoperability.

The EMAP also includes an online assessment tool that may be used by programs to prepare for on-site assessments. The tool helps to determine whether current emergency management and preparedness programs are compliant with EMAP standards. Currently, Florida is the only Gulf Coast State to have received EMAP accreditation. The other Gulf Coast States have completed the baseline assessment, and Texas has scheduled an on-site assessment. Local emergency management agencies also seek accreditation, and East Baton Rouge Parish is currently under a conditional accreditation.

***NUREG-O654/FEMA-REP-1, Revision 1, Criteria for Preparation and Evacuation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plans.*** This guidance document was published by a joint NRC and FEMA Steering Committee in November 1980. The document's purpose is to provide a basis for NRC licensees and State and local governments to develop radiological emergency operations plans and improve emergency preparedness.<sup>20</sup> It provides a common reference and guidance source for FEMA, NRC, and other Federal department and agency personnel involved in the review of State, local, and licensee nuclear facility plans and preparedness.

With regard to evacuation protocols, the original NUREG-0654 document provided a detailed Appendix 1 on protective actions, including evacuation protocol. NUREG-0654 was updated in July 1996 to provide a clear and simplified decision making process for determining protective actions for the public prior to and during severe nuclear reactor core damage accidents. The Supplement 3 guidance emphasizes evacuation as the preferred initial protective action for severe accidents, barring any constraints for evacuation.

## **Other Federal Initiatives to Assist State and Local Government Evacuations**

HSPD-8 notes that the primary means of Federal support to State and local governments is grant awards. To ensure effective use of these funds, grants are generally predicated on statewide adoption of comprehensive all-hazards strategies. For example, HSPD-8 calls for DHS to set national preparedness goals and develop training programs and share lessons learned and best practices. Under HSPD-8, Federal agencies are directed to be prepared to support State and local governments in a disaster by setting goals for teams, stockpiles, and caches to support their NRP

missions. The following lists the DHS grant programs that provide support for State and local evacuation programs.

**DHS Homeland Security Grant Program (HSPG).**<sup>21</sup> The FY 2006 HSGP integrates several DHS grant programs (i.e., the State Homeland Security Program, the Urban Areas Security Initiative, the Law Enforcement Terrorism Prevention Program, the Metropolitan Medical Response System, and the Citizen Corps Program). The funding supports a wide range of activities, including planning, training, and exercises associated with mass evacuation planning. Funding from HSGP is used for projects in support of the national priorities and target capabilities as outlined in the National Preparedness Goal. The devastating aftermath of Hurricane Katrina focused the Nation on the importance of emergency operations planning for catastrophic incidents and resulted in the addition of a priority addressing these concerns in the FY 06 HSGP guidance. The DHS Nationwide Plan Review currently under way is in support of this additional National Priority.

**DHS Emergency Management Performance Grants (EMPG).**<sup>22</sup> The EMPG program assists States and urban areas in achieving the target levels of capability to sustain and enhance the effectiveness of their emergency management program. The EMPG program supports pre-incident planning for catastrophic incidents, which is essential to all of the mission areas of emergency management. These planning efforts include the development of comprehensive emergency operations plans, including annexes and appendices addressing evacuation, shelter and reception, logistics and resource management, and other key plan components. Additionally, EMPG requires that plans are consistent at the State, local, and tribal levels with NIMS to aid in the seamless interface among the elements. With these funds, States support emergency management mission areas and structure individual emergency management programs based on identified needs and priorities for strengthening their capabilities, while simultaneously addressing issues of national concern as identified both in the National Priorities and the TCL. States have the flexibility to develop intrastate and interstate emergency management systems that encourage building partnerships to include government, business, volunteer, and community organizations. It is essential that State and local governments coordinate and establish strong working relationships with neighboring jurisdictions, which may include all levels of government including tribal, in developing emergency management capabilities for joint operations and effective mutual aid and support locally, regionally, State-to-State, and nationwide.

**DHS Competitive Training Grant Program (CTGP).**<sup>23</sup> The CTGP provides funding for training initiatives that prepare the Nation to prevent, respond to, and recover from incidents of terrorism. The CTGP was launched in 2004 to develop specialized training to strengthen preparedness among first responders, public officials, and citizens. Applications for CTGP grants are judged according to specific criteria that stress a cross-disciplinary approach to training, partnerships to maximize program impact, and strong program performance measures. Other factors, such as the proposed program's scope and relevance to the preparedness priorities outlined in the National Preparedness Goal, also are considered.

**DHS Homeland Security Preparedness Technical Assistance Program (HSPTAP).**<sup>24</sup> HSPTAP is a capability-based program that is structured to build and sustain State and local

capacity in priority preparedness activities. Under this vision, the technical assistance services developed and delivered to State and local personnel address the full spectrum of mission areas, national priorities, and target capabilities outlined in the National Preparedness Goal. As State and local agencies identify their capability gaps, the HSPTAP develops services to address those needs and build priority capabilities in the most critical areas. The HSPTAP is designed to address current areas of greatest State and local need. Its mission is to transfer and institutionalize knowledge at the State and local level.

**DHS Gulf Coast Hurricane Preparedness Exercise Series.** The DHS Preparedness Directorate's Office of Grants and Training initiated the U.S. Hurricane Preparedness Exercise Series after Hurricane Katrina. Five exercises are planned in 2006 and will be coordinated with appropriate Federal, State, territorial, and local agencies, as well as partners in the private sector, as appropriate. This effort facilitates the process of consolidating the lessons learned from the previous year's hurricane-related, after-action reports and conferences. It also provides a forum to validate the revised coordination and response plans that address challenges that could arise if another catastrophic storm strikes during the 2006 hurricane season.

**Homeland Security Exercise and Evaluation Program (HSEEP).** The DHS established the National Training Program, a National Exercise Program, and a National Lessons Learned Information Sharing System.<sup>25</sup> These programs use NIMS and include the training required to meet the requirements in the NRP. HSEEP is included in these programs. The purpose of HSEEP is to provide common exercise policy and program guidance that constitutes a national standard for homeland security exercises. HSEEP includes consistent terminology that can be used by all exercise planners, regardless of the nature and composition of their sponsoring agency or organization. HSEEP provides tools to help exercise managers plan, conduct, and evaluate exercises to improve overall preparedness in a consistent manner. HSEEP reflects lessons learned and best practices of existing exercise programs and can be adapted to a variety of scenarios and incidents (e.g., natural disasters, terrorism, and technological disasters). HSEEP integrates language and concepts from the NRP, NIMS, the National Preparedness Goal, the UTL and TCL, and existing exercise programs, and prevention and response protocols from all levels of government.<sup>26</sup>

**Hurricane Evacuation Studies (HESs).** USACE, FEMA, and the National Weather Service (NWS) of NOAA work together to conduct detailed, technical analyses of major evacuations from hurricanes in the United States. HES are designed to provide emergency management agencies with technical data and analysis to support hurricane evacuation planning and implementation decisions. USACE leads the studies, and each agency contributes staff experts and resources. The three agencies establish a working group for each hurricane studied and actively encourage other local, State, and Federal agencies and NGOs such as the American Red Cross to participate in the studies.

HES include modeling of storm, flood, and surge data and analyses of housing and populations, hazards, vulnerabilities, behavior, shelters, and transportation. The studies include projections and analysis on public shelter vulnerability, shelter demand and capacity, traffic control, and clearance time models. The studies also address interagency coordination. HES help officials

decide issues like when and what areas to evacuate in their county, where to shelter them, and what routes to use.

**NOAA's Tropical Prediction Center/National Hurricane Center (TPC/NHC).** In addition to its participation in HES with FEMA and USACE, NOAA provides direct support to State and local agencies for evacuation planning and operations. The TPC/NHC, located in Miami, is a division of NOAA's NWS. It provides operational real-time forecasts, watches, and warnings in text and graphical form for tropical storms and hurricanes in the Atlantic and Eastern Pacific. When tropical storm or hurricane conditions are possible, the center issues the appropriate watches and warnings. Updates are provided at a minimum of every 6 hours. The latest forecasts, watches, and warnings are provided to the public via a variety of sources including the news media, Internet, and NOAA Weather Radio. Conference calls are also made to state and local officials. In partnership with FEMA, the Hurricane Liaison Team (HLT) is activated and resides at TPC/NHC. The HLT, managed and run by FEMA, has direct contact to federal agencies, FEMA regions, and state and local emergency managers. In addition to its hurricane monitoring and reporting, the NWS has several initiatives related to evacuations:

- The NWS conducts service assessments to evaluate its performance during catastrophic weather events. Assessments are conducted when there are major economic impacts on a large area or population, multiple fatalities or numerous serious injuries, and/or unusually high levels of public or media interest. Assessment teams, composed of experts in and outside of the NWS, study what happened and NWS actions before, during, and after the event and then recommend changes in NWS procedures, products, and services to improve performance. Through its service assessments, the NWS continues to improve its prediction and information services for emergency managers, government agencies, and the public.
- A storm surge group provides maps and models with information on storm surge predictions to assist State and local emergency managers in the development of evacuation procedures for coastal areas.
- Local NWS Weather Forecast Offices (WFOs) work directly with local emergency managers and state officials. They add specificity and details to the TPC/NHC information. This helps emergency managers and state officials in their decision making process before, during and after weather events. WFOs often carry evacuation information in their Hurricane Local Statements which receive wide distribution to the public and media.

## **State and Local Roles in Evacuations**

The NRP, NIMS, and SLG 101 all recognize that State and local governments are the first line of emergency response in disasters, including evacuation and sheltering. State and local governments have fire, police, EMS, and emergency management agencies dedicated to disaster response. These agencies have first-hand experience and expertise in emergency management, and have led the development of innovative emergency management strategies. For example, in the 1970s, California was battling significant, fast-moving wildfires. Fire fighters were drawn from many jurisdictions. They found that their management structures were not compatible, and that they could not coordinate the massive mutual aid responses involving dozens of distinct agencies. As a result, an interagency task force of local, State, and Federal agency representatives worked collaboratively to develop the Incident Command Structure (ICS)—a

consistent, integrated framework for the management of large, multi-agency emergencies. The ICS is used extensively throughout the U.S. by State and local emergency response agencies. In some cases, such as a hazardous materials incident in California, it is state law that the ICS be used to handle the situation. As discussed above, under NIMS, DHS mandated the use of ICS for emergency services throughout the U.S.<sup>27</sup>

The governor of a State is its chief executive and directs the State's resources to prepare for and respond to a disaster. The governor encourages State and local agencies to enter into mutual aid agreements with other jurisdictions to share resources. The governor also commands the State's National Guard forces, which may be called upon to help respond to a disaster. In emergency conditions, a governor usually has police powers to make, amend, and rescind orders and regulations. When the State's capabilities are exhausted, the governor may request Federal assistance under the provisions of the Stafford Act.<sup>28</sup>

The county, parish, and city government jurisdictions in a State are given authority through State laws to provide local emergency preparedness and response for their jurisdictions. The city mayor or county or parish manager is the senior local official and directs the emergency response actions and resources in his or her jurisdiction. These senior officials enter into mutual-aid agreements with other jurisdictions to share resources and support each other in an emergency. When the local jurisdiction's capabilities have been exhausted, the senior local official may request State assistance, and if necessary, Federal assistance through the governor.<sup>29</sup>

State and local transportation agencies also play a significant role in evacuation planning and operations. The State DOT, in coordination with the highway patrol or state police, may institute contraflow operations to allow both sides of a limited or controlled access highway to carry evacuees in one direction. Operators of buses from transit agencies and school districts may be prepared and trained to transport evacuees without access to personal vehicles. Depending on conditions and backup power sources, Intelligent Transportation Systems (ITS) technologies, hand-held communication devices, portable cameras, and traffic count detectors can provide critical feedback on evacuation operations. Variable message signs can be deployed quickly to guide evacuees. Through emergency radio broadcasts, State and local transportation agencies can provide real-time information to evacuees and officials to facilitate the evacuation.

Typically, large-scale evacuations are ordered at the county, parish, and city level in coordination with State officials. However, for major hurricanes in which a large number of jurisdictions may evacuate and in which evacuees may also cross State lines, State agencies have begun to coordinate the evacuations. The specific roles of State governments in evacuations vis-à-vis the counties and metropolitan areas vary somewhat from State to State. States almost always manage contraflow operations when necessary and are available to assist local governments in evacuations that exceed local capabilities.

The State laws provide specific authority to the governors and local CEOs with regard to evacuation. The laws vary among the Gulf Coast States, but each includes similar provisions. In general, the State laws may provide:

- State Authority
  - A governor may declare an emergency and assume extra powers and responsibilities to protect the health and safety of the citizens of the State. Specific powers relating to an evacuation include:
    - Create, amend, or rescind rules or directives to provide the necessities of life or supplies and equipment
    - Direct State and local law enforcement officers
    - Prescribe evacuation routes, transportation modes, and destinations
    - Control ingress and egress to the disaster area and the occupancy of premises in the disaster area
  - A governor may order, direct, compel, or recommend an evacuation. Different States use different terms, and there is some confusion by the public about when an evacuation is mandatory and how a mandatory evacuation would be enforced.
  - In some States, the law calls for the governor to designate an Incident Commander to manage the response to the disaster.
  - Under State laws, local jurisdictions are given responsibilities to protect the health and safety of their citizens including:
    - A local jurisdiction provides the first responders to an event in that jurisdiction
    - Most local CEOs can order an evacuation of their jurisdiction to protect the health and safety of their citizens
    - Some local agencies are directed to work with the State or Federal government in the event of a catastrophic incident
    - Cities, counties, and parishes are required to establish emergency management agencies
    - Local agencies are required to develop and implement emergency operations plans
    - Some local agencies are required to coordinate their emergency response plans with the State plan
    - Some local CEOs have delegated powers for their jurisdictions that are similar to the governor's, including changing rules to provide supplies and equipment, direct State and local law enforcement officers, and prescribe evacuation routes and transportation modes.

Many miles of highways across the country include federally owned roads serving Federal lands, including parkways and park roads, forest highway system roads, defense access roads, Indian reservation roads, and other Federal lands roads. These roads are largely the responsibility of Federal Land Management Agencies (FLMAs) who own, maintain and manage these transportation assets. Unlike other public roads, there is no State authority for Federal lands roads.

## **NGO Roles in Evacuations**

NGOs such as the American Red Cross and volunteer organizations such as Citizen Corps also play important roles in disaster response. The American Red Cross has a unique relationship with the Federal government in disaster response and is delegated responsibility for ESF-6, Mass

Care. The American Red Cross was chartered by Congress in 1900 to support international and domestic humanitarian initiatives such as maintaining a system of domestic and international disaster relief, including mandated responsibilities that are now incorporated into the NRP and coordinated by FEMA.<sup>30</sup> The American Red Cross receives its financial support from voluntary public contributions and from cost-recovery charges for some of its blood and training services. Under limited circumstances, the American Red Cross receives funding for certain programs when the funding requirements are beyond those supported by the charitable public. At times, Federal and State government agencies also contract with the American Red Cross and provide material aid and assistance to support the fulfillment of its charter obligations.

The American Red Cross disaster relief focuses on meeting people's immediate emergency disaster-caused needs. When a disaster threatens or strikes, the American Red Cross provides shelter, food, and health and mental health services to address basic human needs. In addition to these services, the core of American Red Cross disaster relief is the assistance given to individuals and families affected by disaster to enable them to resume their normal daily activities independently. The American Red Cross also feeds emergency workers, handles inquiries from concerned family members outside the disaster area, provides blood and blood products to disaster victims, and helps those affected by disaster to access other available resources.

The National Voluntary Organizations Active in Disaster (NVOAD) is a consortium of national volunteer organizations, including national and international charities and foundations, religious organizations, emergency response organizations, and humane societies. NVOAD coordinates planning efforts for many voluntary organizations responding to a disaster. When a disaster occurs, NVOAD or one of its State affiliates encourages members and other voluntary agencies to convene on site. This cooperative effort has proven to be an effective way for a wide variety of volunteers and organizations to work together in a crisis.<sup>31</sup>

In addition, DHS administers Citizen Corps to support citizen participation in public education efforts, citizen participation in training and exercises, and administration of community safety volunteer programs through local Citizen Corp Councils. Under the Citizen Corps umbrella, DHS also supports the Community Emergency Response Team (CERT) Program, which educates people about disaster preparedness and trains them in basic disaster response skills such as fire safety, light search and rescue, and disaster medical operations. Using their training, CERT members can assist others in their neighborhood or workplace during an incident and can take a more active role in preparing their community in coordination with their local first responders.<sup>32</sup> Both NVOAD and the American Red Cross are Citizen Corps Affiliates.

## **Federal Roles in Evacuations**

In a catastrophic incident, State and local emergency resources would be overwhelmed and the Federal government, as described above under the NRP, would join the affected States to immediately deploy essential Federal resources and acquire State or private sector resources from outside the area to help meet evacuation needs. HSPD-5 states:

The Federal Government recognizes the roles and responsibilities of State and local authorities in domestic incident management. Initial responsibility for managing domestic incidents generally falls on State and local authorities. The Federal government will assist State and local authorities when their resources are overwhelmed, or when Federal interests are involved. The Secretary (of DHS) will coordinate with State and local governments to ensure adequate planning, equipment, training, and exercise activities. The Secretary will also provide assistance to State and local governments to develop all-hazards plans and capabilities, including those of greatest importance to the security of the United States, and will ensure that State, local, and Federal plans are compatible.<sup>33</sup>

The NRP established a process for managing information flow and decision making for local, State, and Federal level emergency response agencies and first responders in the field for mass evacuations from a catastrophic incident. The NRP and supporting documents such as NIMS and SLG 101 define the command structures and include delineation of responsibilities and State statutory authorities. The NRP also describes the roles and coordination of the President and the Secretary of DHS, and the leadership of the involved Federal agencies in managing the Federal response to an incident. In the field, systems are established to coordinate local, State, and Federal response at regional and local levels. The command structure described in NIMS and NRP are flexible and scaleable and meant to be tailored to the specific requirements of a catastrophic incident.

In a mass evacuation from a catastrophic incident, the local public safety and emergency response agencies are generally the first on the scene and initiate the evacuation. A catastrophic incident triggers the mobilization of State and then Federal resources to respond. The following lists show the major components of the command structure for the State and local level response and for the Federal level for transportation. Appendix H of this report includes a description of each of these components. In addition to this command structure, when the Secretary of Defense authorizes Defense Support of Civil Authorities (DSCA) for domestic incidents, the Department of Defense (DOD) retains command of military forces under DSCA and coordinates its activities with the Unified Area Command Structure.

Major components of the State command structure include:

- Governor
- Tribal Chief Executive Officer (CEO)
- State Emergency Operations Center (EOC)
- State Coordinating Officer (SCO)
- Unified Area Command Structure
- State Emergency Management Agency
- Local Chief Executive Officer (CEO)
- Law Enforcement Agencies (State and local)

Major components of the command structure for the Federal level response for transportation include:

- Homeland Security Council (HSC)
- Homeland Security Operations Center (HSOC)
- Interagency Advisory Committee
- National Response Coordination Center (NRCC)
- Regional Response Coordination Center (RRCC)
- Joint Field Office (JFO)
- Principal Federal Officer (PFO)
- Federal Coordinating Officer (FCO)
- Federal Resource Coordinator (FRC)
- Senior Federal Law Enforcement Official (SFLEO)
- Emergency Support Functions (ESFs)
- Emergency Support Function (ESF) Coordinator
- Emergency Support Function #1 (Transportation)
- Office of Intelligence, Security and Emergency Response (OST/S-60)
- Crisis Management Center
  - DOT Modal Representatives/Subject Matter Experts
- Regional Emergency Transportation Coordinator (RETCO)
  - Regional Emergency Transportation Representative (RETREP)
  - DOT Emergency Coordinators (EC)

## **U.S. DOT Roles, Programs, and Initiatives to Support Evacuations**

This section summarizes the U.S. DOT's responsibilities to coordinate ESF-1, identifies ESF-1 support agencies, and describes the activities of the Department and the transportation industry in the evacuations for Hurricanes Katrina and Rita.

Under the National Response Plan, DOT is the Primary and Coordinating Agency for ESF-1. The National Response Plan also identifies the following ten entities as ESF-1 Support Agencies: the Departments of Agriculture, Commerce, Defense, Energy, Homeland Security, Interior, Justice and State, as well as the General Services Administration and the U.S. Postal Service.

ESF-1 is designed to provide transportation support to assist in domestic incident management. Activities within the scope of ESF #1 include:

1. Processing and coordinating requests for Federal and civil transportation support as directed under the National Response Plan (NRP)
2. Reporting damage to transportation infrastructure as a result of the incident
3. Coordinating alternate transportation services
4. Coordinating the restoration and recovery of the transportation infrastructure
5. Performing activities conducted under the direct authority of DOT elements such as air, maritime, surface, rail, and pipelines
6. Coordinating and supporting prevention/preparedness/mitigation among transportation infrastructure stakeholders at the state and local level.

Specifically related to evacuations, the National Response Plan states that ESF-1:

Provides technical assistance to Federal, State, local, and tribal governmental entities in evacuation or movement restriction planning, and determining the most viable transportation networks to, from, and within the incident area, as well as alternative means to move people and goods within the area affected by the incident.<sup>34</sup>

Coordinates and implements, as required, emergency-related response and recovery functions performed under DOT statutory authorities, including the prioritization and/or allocation of civil transportation capacity, ...to include safety- and security-related actions concerning movement restrictions, closures, quarantines, and evacuations.<sup>35</sup>

Other ESF-1 responsibilities that relate directly to evacuation include coordinating the provision of Federal and private transportation services to support State and local governments; providing staffing and liaisons for ESF-1 functions in headquarters, region, and local emergency facilities; and managing the financial aspects of emergency transportation services.

The U.S. DOT's ESF-1 responsibilities are managed and coordinated by the Office of Intelligence, Security, and Emergency Response within the OST. During an incident, the Secretary surges the Department's Emergency Response Team through its 24/7 Crisis Management Center, activates Emergency Coordinators in the various modal administrations (e.g., Federal Highway Administration, Federal Transit Administration, Federal Railroad Administration, Federal Aviation Administration, Federal Motor Carrier Safety Administration, and Maritime Administration), and deploys field staff to support local, state, and regional response under the frame work of the National Response Plan.

## **U.S. DOT Response to Hurricanes Katrina and Rita and Preparations for 2006 Hurricane Season**

The U.S. DOT, with its operating administrations, faced many challenges with hurricanes Katrina and Rita. A key challenge faced during Hurricane Katrina evacuations was the ability to obtain the desired number of buses, trains and aircraft. The Department of Defense was assigned

the task of providing the command, control and communications for the evacuation of New Orleans.

While the systems, plans, and training that the U.S. DOT had in place generally worked well, they were not sufficient for disasters the size of Hurricane Katrina. The U.S. DOT is working to further institutionalize ESF-1 program needs within its operations and to improve the understanding of chain of command, roles, responsibilities, and needed coordination. Telecommunications systems, including satellite phone, failed, and it was difficult to obtain information on the status and needs for the post-event evacuation. Communications and coordination with FEMA staff were also difficult, and authorities were unclear.

Because there had been little advance planning and intergovernmental communication for mass evacuations by other than private vehicles, officials on the scene were sometimes unable to assemble or stage significant numbers of evacuees to use vehicles provided to some areas. Some trains and buses left the area with very few passengers. The evacuation problems were compounded by the lack of communication with buses and local officials.

While the U.S. DOT's role was to provide transportation equipment and services for the evacuation to meet its mission, the Department provided assistance to other Departments, agencies, and ESFs in helping to identify staging areas and pick-up times; find destination shelters for evacuees; and provide security on some evacuation vehicles.

More DOT experiences and initiatives following Hurricanes Katrina and Rita are described for the following specific areas.

**Highway.** In response to Hurricanes Katrina and Rita, FHWA staff from headquarters, division, metropolitan, and resource center offices provided personnel support at ESF-1 and other offices throughout the response network. The FHWA EC in each affected state provided highway infrastructure situational awareness information. The ELT facilitated pre-landfall evacuation and contraflow operations throughout the region and supported the post-landfall evacuation operations in New Orleans post-landfall. Using its Emergency Relief Program funding authority, FHWA provided debris removal and emergency repair funding. FHWA subject matter experts provided technical assistance and subject matter expertise to State DOTs to facilitate the speedy design of temporary repairs.

To prepare for the 2006 hurricane season and to enhance overall preparedness, FHWA is currently developing a series of primers to assist State and local emergency response and transportation agencies in planning for evacuations. These documents will be widely distributed and will also serve as training material for a series of regional workshops.

**Intelligent Transportation Systems.** The ITS Joint Program Office (JPO) of DOT supports the development of advanced technologies to improve the safety and efficiency of transportation systems. A major initiative addressing emergency transportation operations is now being revised to better focus on the development and application of ITS technologies to improve evacuation planning, monitoring, and implementation. It is expected that the revised initiative will improve the information available to travelers as well as decision-makers engaged in evacuations.

**Buses.** During Hurricanes Katrina and Rita, FMCSA functioned as a clearinghouse of information for truck and bus companies in obtaining necessary authorizations to operate under emergency conditions. In working with the motor carrier industry assisting with evacuations for Hurricanes Katrina and Rita, the FMCSA established a single point of contact (POC) that was supported by a technical advisory team. In connection with Hurricanes Katrina and Rita, the FTA worked in partnership with the American Public Transportation Association (APTA) to identify buses, mechanics, and volunteer drivers from transit agencies across the country who could assist in the evacuation. APTA worked with FTA to determine how support from the transit industry could be provided and served as an industry liaison to the federal government.

The U.S. DOT has an inventory of over 4,000 companies, with over 100,000 buses nationwide, which is available for use by its national contractor, Landstar. This includes fixed route motor coaches, tour bus operators, and school buses that are available for charter. The U.S. DOT is working with the American Bus Association to further index capabilities including wheel chair compatibility, and number of evacuation-ready vehicles and drivers. Agreements are also being developed with bus operators for standardized rates and terms for evacuation assistance. These actions will allow the U.S. DOT to quickly acquire assets and support the dispatch, command, and control of those assets. The U.S. DOT is working with APTA to rapidly access surge capacity from nearby public transportation assets, including both buses and special needs vehicles, to support evacuations. APTA has formed the APTA Emergency Preparedness Task Force to develop strategies to improve the working relationship and coordination with the governments at all levels in emergency response

**Transit.** During the evacuations and response to Hurricanes Katrina and Rita, FTA staff was deployed to the CMC to provide support for ESF-1 functions. FTA also worked in partnership with APTA to identify buses, mechanics, and volunteer drivers from transit agencies across the country. APTA worked with FTA to determine how support from the transit industry could be provided and served as an industry liaison to the federal government. Since Hurricane Katrina, APTA has formed the APTA Emergency Preparedness Task Force to develop strategies to improve the working relationship and coordination with the governments at all levels in emergency response. In September 2005, FTA posted “Hurricane Katrina Information for FTA Grantees” on its internal Web site available to its grantees. This information package provides guidance on FTA funding and regulations affecting hurricane response and recovery.

**Aircraft.** The FAA worked closely with the DHS (including FEMA and TSA), DOD, and other Federal, State, and local partners, as well as private sector air operators to quickly restore air transportation to the Gulf Coast region needed to support the post-landfall evacuation of the New Orleans area. Under the extremely difficult conditions after Hurricane Katrina, the FAA was able to quickly restore critical air navigation services in the damaged areas, giving priority to airports (e.g., Louis Armstrong New Orleans International Airport) and services needed to support evacuation flights and other critical relief missions. The agency, in coordination with its partners, also rapidly implemented airspace and other air traffic operations measures. In addition, the FAA temporarily eased regulatory restrictions

on the maximum flight hours for crews involved in the air evacuations to assist carriers in their scheduling requirements.

To prepare for the 2006 hurricane season, the U.S. DOT is working with the Air Transport Association (ATA) and its members to ensure that passenger aircraft can be obtained faster and used more efficiently. This includes airlines moving in support equipment, ground crews, and other people and equipment that a damaged airport (like Louis Armstrong International during Katrina) may not be able to provide. A registry, similar to the one described above for buses, is being developed in conjunction with the Helicopter Association International, which represents helicopter owners and operators across the nation.

**Passenger Rail.** In response to Hurricanes Katrina and Rita, the Federal Railroad Administration (FRA) staffed the CMC and FEMA regional emergency operations centers and worked with Amtrak, commuter trains, and freight railroads who were deployed to support emergency response. Trains were used to move some evacuees out of the region and to transport heavy equipment, supplies, and relief equipment into the area. A challenge was faced with staging evacuees for passenger rail services offered by Amtrak, due to the lack of communication, coordination, and prior planning among local, State, and Federal officials. Assistance offered by Amtrak prior to the landfall of Hurricane Katrina was not accepted and resulted in a train with 900 seats (7 locomotives and 20 cars) leaving prior to the storm.

To prepare for the 2006 hurricane season, the FRA is now working with Amtrak to pre-identify trains, routes, and stations ahead of landfall in the event passenger rail is needed for evacuations.

**Marine.** Ten MARAD ships in its RRF were activated to aid in the response and recovery to Hurricanes Katrina and Rita. Through the ESF-1 program, the U.S. DOT and MARAD coordinated with FEMA on the availability and capacity of the ships. The activation of these ships for a domestic emergency was unprecedented and provided the Gulf Coast with supplies, water, electricity, and food and shelter for rescue and recovery workers. In preparation for Hurricane Rita, MARAD ships were stationed as shelters for equipment and emergency responders prior to the hurricane to support post-storm evacuations and recovery activities. The ships sheltered police dogs, emergency equipment, and personnel from six jurisdictions. The ships allowed emergency personnel and equipment to be sheltered during the storm so that they could be rapidly deployed for post-event evacuations and emergency response.

## **Future Evacuation Roles for the U.S. DOT**

Improved coordination with State and local agencies, transportation providers, sheltering agencies, and others that has begun in 2006 will continue in subsequent years as will technical assistance and coordination with DHS and others on regional exercises. These activities will better enable State and local agencies to conduct mass evacuations without having to call on Federal resources, and when Federal resources are needed in connection with a catastrophic incident, will better prepare all involved to efficiently and effectively coordinate required evacuation activities.

## Chapter 3: Evacuation Plan Assessment Methodology

This chapter describes the U.S. DOT's study methods used to evaluate the local, State, and Federal plans for evacuations related to hurricanes or other catastrophic incidents in the Gulf Coast region. The U.S. DOT, in coordination with the DHS, collected and evaluated information from State and local plans; held discussions with State and local emergency management, transportation, and law enforcement officials; conducted a review of literature and research on mass evacuations; and vetted concepts with representatives of transportation associations. The U.S. DOT also evaluated its own response to Hurricanes Katrina and Rita and incorporated these findings with the results of the State and local assessments to develop lessons learned, best practices, and findings and recommendations for this report.

Section 10204 of the SAFETEA-LU and the FY 2006 DOT Appropriations Act included specific factors that were a part of this evaluation, such as the potential modes of transportation in evacuations, coordination with neighboring jurisdictions, and communications before and during evacuations. Figure 3-1 lists the eight factors identified in the legislation. The U.S. DOT added other factors to develop a comprehensive view of mass evacuation planning in the region. These factors are discussed in more detail below.

The objective of the evaluation was to assess the status of evacuation planning processes in the Gulf Coast region to determine how well they address the various aspects of evacuation planning and operations, the constraints that State and local jurisdictions face in preparing and implementing evacuation plans, and actions that could be taken to improve evacuation capabilities. The purpose of the evaluation was not to grade the individual local and State plans, but rather to assess and gather information from those plans that will help local, State, and Federal agencies improve their evacuation processes in the future.

The study was led by a U.S. DOT team of representatives from the Office of the Secretary (OST), FHWA, FTA, FRA, FAA, and FMCSA, with assistance from a consultant team. The U.S. DOT also sought comments on the criteria from representatives of a number of its key partners and stakeholder agencies and associations. These included AASHTO, APTA, the

**Figure 3-1: Congressional Criteria**

***Section 10204 of SAFETEA-LU and the FY 2006 Department of Transportation Appropriations Act***

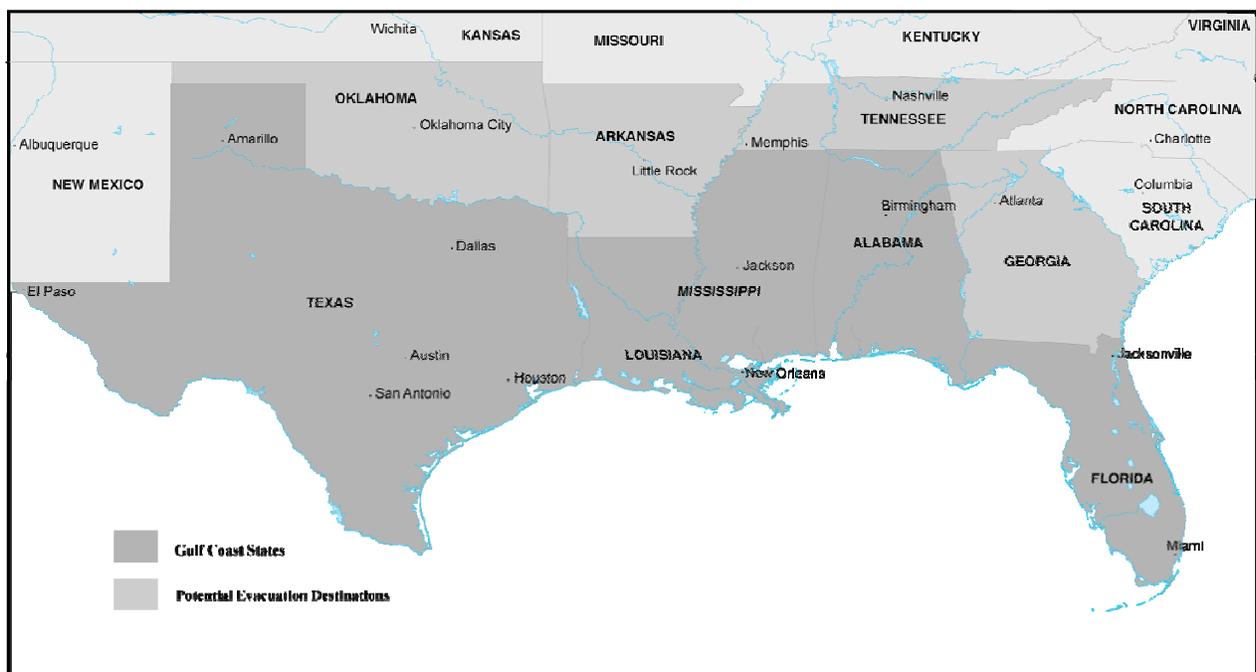
1. All safe and practical modes of transportation available for evacuations.
2. The extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions.
3. Methods of communicating evacuation plans and preparing citizens in advance of evacuations.
4. Methods of coordinating communication with evacuees during plan execution.
5. The availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes.
6. The time required to evacuate under the plan.
7. The physical and mental strains associated with the evacuation.
8. The extent to which the evacuation plans are coordinated with the point receiving the evacuated personnel.

American Trucking Associations, American Association of Railroads (AAR), American Bus Association (ABA), Amtrak and the National Council on Disability.

## Scope of the Plan Evaluation

Hurricane evacuation plans are prepared at various levels of government including State, county, and municipal, and may be prepared by a variety of agencies ranging from a State DOT, to a State emergency management agency, to a municipal public works agency, or even to a State highway patrol agency. For the evaluation of the adequacy of State and local evacuation plans, the U.S. DOT collected and assessed the plans from various agencies within a State, as well as neighboring jurisdictions that were involved, and assessed how the agencies coordinated their plans across geographic and political boundaries.

**Figure 3-2: States Included in Assessment**



The review included the State and local jurisdictions in the Gulf Coast region that were involved in major hurricane evacuations (i.e., the States of Alabama, Florida, Louisiana, Mississippi, and Texas). The State and local evaluation reviewed plans for moving people away from areas threatened by catastrophic incidents and for accepting evacuees from other areas, including emergency evacuation plans that were available from State, county, and parish emergency management agencies. The U.S. DOT reviewed evacuation plans for coastal counties and the adjacent counties along the Gulf Coast and many of the counties of Florida. In addition, the evaluation included an assessment of sheltering plans for the States of Arkansas, Georgia, Oklahoma, and Tennessee, because these states may be among those to receive large numbers of evacuees from a catastrophic hurricane. Figure 3-2 shows the States included in the assessments.

The U.S. DOT requested copies of the evacuation plans through three means:

1. The DHS Nationwide Plan Review
2. The Secretary of Transportation's letter to the Governors (see Appendix A)
3. Direct contact with State and local emergency managers and transportation officials.

The U.S. DOT also consulted with the State emergency management agencies to validate that the plans provided included all relevant plans available in each State. While the U.S. DOT did not receive evacuation plans from every jurisdiction in time for the study, the Department collected and assessed evacuation plans from 63 jurisdictions in the Gulf Coast region. This included plans from each of the 5 Gulf Coast States and 58 plans from county and parish jurisdictions from Florida and the coastal counties of Alabama, Louisiana, Mississippi, and Texas. The set of collected plans provided a representative base from which to assess the overall adequacy of evacuation planning for those areas in the Gulf Coast region with the greatest threat of catastrophic hurricanes. Appendix B lists the jurisdictions and agencies included in the assessment of the 5 Gulf Coast States.

## Coordination with DHS Study

The U.S. DOT and DHS worked together to coordinate the U.S. DOT study of mass evacuation planning for the Gulf Coast region and the DHS nationwide review of catastrophic emergency operations plans. The U.S. DOT and DHS coordinated the methodologies, criteria, and assessment tools for each study. The U.S. DOT and DHS study teams coordinated site visits and discussed feedback and results and findings and recommendations from the site visits.

Although the U.S. DOT and DHS studies are related, the scope and focus of the two are different. The DHS study assessed the overall emergency operations plans for catastrophic incidents for States, territories, and large urban areas nationwide. The U.S. DOT study focused on mass evacuation planning elements for States, counties, and parishes in the Gulf Coast region. Evacuation plans are generally a subset of or an annex to overall emergency operations plans.

## Methodology

To meet the Congressional requirements for this study and assess the range of factors included in effectively planning and executing a mass evacuation, the U.S. DOT developed a systematic, analytical process to evaluate the readiness and adequacy of State and local jurisdictions to move people in the Gulf Coast region away from catastrophic incidents and to safe shelter. The U.S. DOT's methodology included identifying the major components of a comprehensive evacuation planning and implementation program, collecting current practices and information on evacuations, developing criteria to evaluate current plans, conducting on-site discussions with

**Figure 3-3: DOT Study Process**

1. Identify Key Elements of Evacuation Planning and Implementation
2. Review Current Evacuation Practices
  - a. Review Existing Guidance
  - b. Conduct Literature Review
  - c. Analyze Costs
3. Develop Plan Evaluation Criteria
4. Assess Plans and Conduct Site Visits
5. Identify Lessons Learned and Best Practices
6. Develop Findings and Recommendations

State and local emergency management officials, assessing the plans, identifying lessons learned and best practices from recent evacuations, and developing findings and recommendations to improve mass evacuation planning in the Gulf Coast region and nationwide. Figure 3-3 highlights the study process.

## Identify Key Elements of Evacuation Planning and Implementation

The body of the report is been organized by the key elements related to mass evacuation planning and operations for catastrophic incidents. These elements are major categories of activities or functions that local, State, and Federal emergency management agencies would conduct to plan and execute a mass evacuation. Figure 3-4 shows the seven key elements of mass evacuation planning and operations.

### Review Current Evacuation Practices

To establish the current framework that guides evacuation planning and implementation, the U.S. DOT collected and reviewed guidance, literature and research, cost data, and other information on evacuations.

- **Review Existing Guidance:** The U.S. DOT reviewed the current guidance for local, State, and Federal agencies regarding evacuations. This included the more recent NRP and NIMS from DHS as well as SLG 101, NFPA 1600, and NRC evacuation guidance that has been used for a number of years. These documents provide the framework, guidance, and considerations used by agencies throughout the government as well as NGOs such as the American Red Cross to prepare for and implement a mass evacuation. This guidance is discussed earlier in this report.
- **Conduct Literature Review:** The literature review provided additional information to guide the methodology and evaluation criteria for the study. The U.S. DOT collected relevant domestic and international evacuation reference materials, plans, policies, procedures, newspaper and magazine articles, journals, industry publications, and other documents. It reviewed and analyzed the documents and compiled the results into a bibliography. The literature review also identified lessons learned and best practices from after-action reports and case studies.

The literature review addressed both anecdotal information and documented assessments of hurricane evacuation experiences, lessons learned, and guidance for transportation, public safety, and emergency management agencies that may have been developed following evacuation events. It collected documentation on pre-event public information campaigns that agencies implement to inform the public of evacuation routes and procedures and to manage public expectations. The review also included documents related to both rural and urban situations.

**Figure 3-4: Key Elements**

***Key Elements to Plan and Execute  
a Mass Evacuation from  
Catastrophic Events***

1. Decision Making and Management
2. Planning
3. Public Communication and Preparedness
4. Evacuation of People with Special Needs
5. Operations
6. Shelter Considerations
7. Training and Exercises

- **Analyze Cost:** The purpose of the cost analysis was to examine the cost of mass evacuation plans in the Gulf Coast region. The cost analysis was used to identify and define the costs associated with and incurred in mass evacuation plans. Very little data are available on the costs of developing and implementing evacuation plans, and the limited cost information received for this study is incomplete. State officials noted that determining the amount of funding allocated and spent for evacuation planning would be difficult since funding comes from many sources at the local, State, and Federal level and many agencies within the various levels of government have agencies involved in evacuation planning. Information from the Gulf Coast States on the costs of evacuation is provided in Chapter IV, the Planning Key Element section, later in this report.

## **Develop Plan Evaluation Criteria**

The U.S. DOT developed evaluation criteria that focus on local and State actions necessary to plan for and implement a mass evacuation. These actions include written policy directives; coordination of planning processes; and provisions made to communicate information to evacuees before, during, and after evacuation. The criteria were used for the detailed review of individual written evacuation planning documents from the jurisdictions in the Gulf Coast region. The criteria were also reviewed and validated during the discussions with the State and local officials during the site visits.

The U.S. DOT developed the evaluation criteria from information gathered from current Federal guidance on evacuation planning and operations as well as recent questions raised after the evacuations for the catastrophic hurricanes in 2005. Specifically, questions used to evaluate plans were drawn from:

- FEMA SLG 101: Guide for All-Hazard Emergency Operations Planning
- HSPD-5: Management of Domestic Incidents
- NIMS
- NRP, Volunteer and Donations Management Support Annex.
- SAFETEA-LU
- FY 2006 DOT Appropriations Act
- Findings from recent government reports including the White House, House of Representatives, and GAO reports and the Task Force Report to the Texas Governor on the Hurricane Katrina response.

Table 3-1 lists the 20 general questions developed by the U.S. DOT to evaluate evacuation plans for this study. For each of the questions, a list of attributes (stated as questions) was developed to define and support the parameters of each question. For example, within the category of communicating evacuation considerations, one of the questions is: “Does the plan describe the provisions and methods for alerting citizens that evacuation may be necessary?” Within this general question, several more specific questions were used to evaluate the plan (e.g., Does the plan identify contingency plans to use if normal means of public communications are unavailable? Does the plan include provisions for communicating with special needs evacuees

such as hearing, vision, and physically impaired?). Appendix E provides the detailed list of questions used to evaluate State and local evacuation plans.

Each attribute was also characterized into two distinct categories—essential and non-essential. Essential means that if the attribute were not addressed in the plan, executing key aspects of the evacuation would at risk. Non-essential means that failure to address the attribute could impair execution of the plan but would not be expected to cause key aspects of an evacuation to fail. These two categories were used to weigh individual attributes and prioritize activities..

**Table 3-1: General Evaluation Questions**

<b>Plan Evaluation Questions for Mass Evacuation from Catastrophic Incidents</b>	
<b><i>Decision Making and Management</i></b>	
<b>D1</b>	Does the plan describe direction and control with respect to catastrophic evacuation?
<b>D2</b>	Does the plan describe the provisions needed to execute a large-scale evacuation?
<b><i>Planning</i></b>	
<b>P1</b>	Does the plan address evacuation planning considerations (e.g., decision making, communications, available transportation modes, special needs, and sheltering) with regard to catastrophic hurricanes and other catastrophic events?
<b>P2</b>	Does the plan require organizations to prepare standard operating procedures that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks?
<b>P3</b>	Does the plan include provisions for returning evacuees to their homes?
<b><i>Public Communication and Preparedness</i></b>	
<b>C1</b>	Does the plan describe the provisions and methods for alerting citizens that evacuation may be necessary?
<b>C2</b>	Does the plan identify what will be done to keep evacuees informed during evacuation to reduce their level of mental and physical stress?
<b>C3</b>	Does the plan describe the means the government will use to keep evacuees and the public informed on the specific actions they should take after the evacuation has started?
<b><i>Evacuation of People with Special Needs</i></b>	
<b>N1</b>	Does the plan describe provisions for evacuating special needs populations including those in assisted living facilities, hospitals, and those living independently (e.g., people with physical, mental, cognitive, and developmental disabilities)?
<b>N2</b>	Does the plan describe provisions for evacuating other special needs populations (e.g., people in schools, day centers, mobile home parks, prisons, and detention centers, as well as, people that do not speak English or who are tourists, seasonal workers, or homeless)?
<b><i>Operations</i></b>	
<b>O1</b>	Does the plan describe the safe and practical transportation modes that will be available to move evacuees that cannot transport themselves (other than special needs populations)?
<b>O2</b>	Does the plan include provisions to ensure availability of public and private transport modes and necessary transport operators?
<b>O3</b>	Does the plan identify evacuation routes?

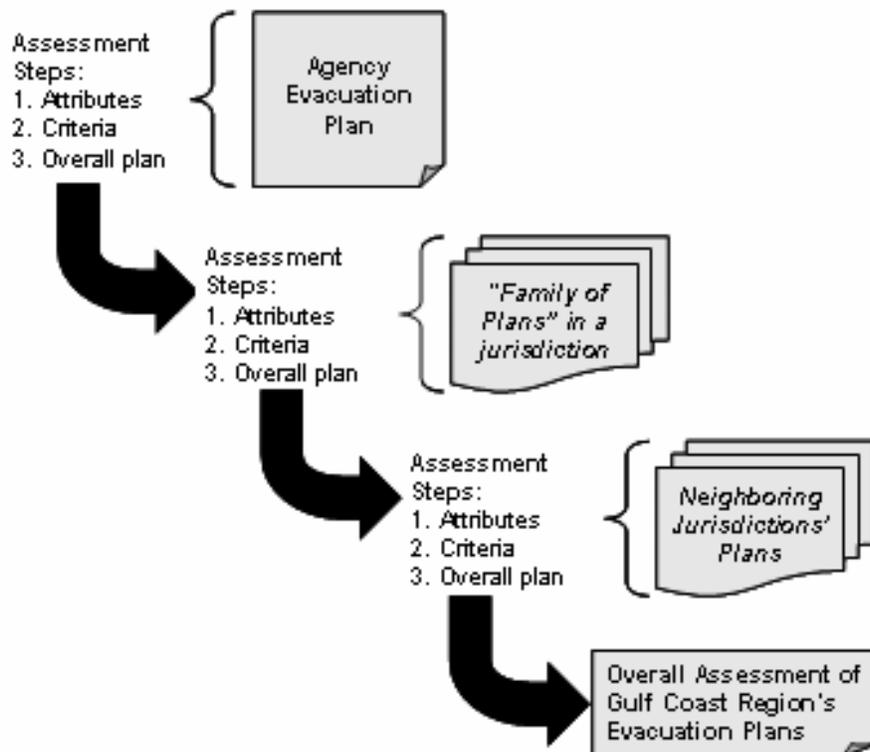
<b>Plan Evaluation Questions for Mass Evacuation from Catastrophic Incidents</b>	
<b>O4</b>	Does the plan address the use of contraflow measures?
<b><i>Sheltering Considerations</i></b>	
<b>S1</b>	Does the plan require the establishment of mutual aid agreements with other jurisdictions to formalize access to and use of shelters?
<b>S2</b>	Does the plan include provisions for informing shelter operators and evacuees about the locations of public shelters outside of the evacuation area and their status (e.g., full, accepting evacuees, accepting evacuees with pets, special needs shelters, etc.)?
<b>S3</b>	Does the plan address strategies and responsibilities for shelter operations?
<b>S4</b>	Does the plan include provisions for the care and protection of animals?
<b><i>Training and Exercises</i></b>	
<b>T1</b>	Does the plan include provisions for training a volunteer cadre to support shelter management operations, transport of evacuees, and first aid stations along the evacuation routes, etc.?
<b>T2</b>	Does the plan require periodic reviews and updates of the plan, exercises and/or drills, and after-action reports as part of the planning process?

### *Evaluation of Written Plans*

Evacuation planning and operations is a complex process that involves many emergency operation functions. Evacuation plans are generally included in a "family of plans." This means that evacuation plans are often components of the all-hazard emergency response plans developed by State and local governments. Requirements relating to evacuation planning are generally addressed in several parts of the plan, rather than only in an evacuation section. Evacuation plans are included in the basic plan, direction and control, evacuation, emergency public information, resource management, and mass care or the ESF annexes in the emergency response plan. In some jurisdictions, stand-alone hurricane evacuation plans have been prepared. Whether a single plan or a family of plans, these are the primary documents that governments rely on to detail what they will do in catastrophic incidents that warrant mass evacuations.

For this study, the U.S. DOT assembled and assessed these families of plans relating to evacuations for the Gulf Coast jurisdictions to determine how they address the evacuation planning and operational questions developed for this evaluation. The study also assessed how the jurisdictions' plans coordinated with their neighboring jurisdictions and then how all of the jurisdictions in the Gulf Coast region coordinate together to prepare for catastrophic hurricanes. This included assessment of the plans of the neighboring "host" states (i.e., Arkansas, Georgia, Oklahoma, and Tennessee) for sheltering evacuees from the Gulf Coast region.

Figure 3-5 illustrates how the study methodology starts with the assessment of individual plans and then assesses and compares the family of plans that include the individual plan. The evaluation then assesses the coordination with neighboring jurisdictions.

**Figure 3-5: Study Methodology for Assessment of Individual Plans****Progressive Steps: Assess Individual Plans, Families of Plans, Neighboring Plans, and Overall Plans for the Gulf Coast region**

The individual plan assessments included three steps:

**Step 1:** The first step is a detailed assessment of how a given plan addresses individual attributes for each of the 20 general evaluation questions:

- Each attribute is scored on a scale of 0 to 3.
  - 0 = the attribute was not addressed in the plan
  - 1 = the attribute was only partially addressed in the plan
  - 2 = the attribute was completely addressed in the plan
  - 3 = the plan exceeds the requirements of the attribute, and is a potential best practice.

**Step 2:** The second step is to score the degree to which the plan fulfills each general evaluation question.

- The attributes are sorted into essential and non-essential categories.
- The scores for each attribute from Step 1 are converted into weighted scores, using different weights for essential and non-essential attributes.

The weighted scores for all attributes are added and divided by the total of their weights, to determine the average weighted score for each question.

**Step 3:** The final step is to roll-up the average weighted scores from all of the plans for each general question. Based on the cumulative score, each question is then given a rating, based on the levels described in Table 3-2.

**Table 3-2: Evaluation Ratings**

Rank	Cumulative Score	Description	Representation
4	1.51 – 2.00	Very Effective	
3	1.01 – 1.50	Effective	
2	0.51 – 1.00	Partially Effective	
1	0.00 – 0.50	Marginally Effective	

## Conduct Site Visits

A key step in the U.S. DOT's study methodology was the on-site discussions with key State and local emergency management, transportation, law enforcement, and non-governmental organization officials. In these meetings, the U.S. DOT discussed and validated the initial results from the evaluation of the written evacuation plans. Written State and local plans did not contain all of the information needed to assess key issues pertaining to evacuation plans. For example, plans do not usually include the cost of implementing the plans, constraints on what can be included in the plans, and recommendations for actions to improve State and local evacuation capabilities beyond the scope of the plan.

The U.S. DOT conducted one visit in each State, and coordinated whenever possible with the DHS staff conducting the on-site peer reviews for Phase II of the DHS Nationwide Plan Review. The U.S. DOT was also able to participate in some of the DHS meetings, and its objectives for each meeting included:

- Review and validate the evaluation questions developed for the review
- Discuss any remaining questions from the review of State and local written evacuation plans
- Identify any other documents that may be available that further elaborate on key aspects of evacuation plans and generally confirm how key components of evacuation plans are handled
- Discuss costs of planning and implementing the plans with State and local officials and identify the extent to which costs are a significant constraint on evacuation planning and execution
- Discuss any other constraints that State and local officials identified as affecting their ability to effectively plan and execute evacuations
- Discuss actions that State and local officials believed could improve their ability to plan and conduct evacuations
- Discuss initial best practices and lessons learned from the literature review and identify potential additional best practices

- Discuss any updates to evacuation plans that may be underway or planned and the nature of changes expected in those updates
- Vet initial findings and recommendations with subject matter experts at the State and local level to clarify and refine the assessment.

The on-site meetings were a valuable source of additional information and provided a more comprehensive picture of the status of mass evacuation planning and operations in the region. The attendees at the State and local meetings were experts in evacuation planning and operations. Many had years of first-hand experience managing evacuations under very difficult conditions. Their knowledge, expertise, and experience were invaluable to this study. The U.S. DOT prepared a summary of each State visit, and a group of separate reports documents the constraints, recommendations, and best practices. Appendix D includes a list of the State and local agencies that participated in the on-site meetings.

## Identify Lessons Learned and Best Practices

From the literature review, the U.S. DOT identified a number of lessons learned and best practices. These lessons learned and best practices were discussed with the participants in the State visits and coordinated with the partners and stakeholders to help identify the highest priority issues. Lessons learned identify gaps, mistakes, or problems encountered that can or should be fixed. A best practice is an effective practice that can be replicated in other jurisdictions. It is typically based on an actual event, so that it has been proven effective in the field.

After-action reports are prepared after drills and exercises and major events. The reports summarize the events and identify what did and did not perform efficiently and effectively. Emergency responders use this analysis of their capabilities to continually improve their plans and processes. The U.S. DOT evaluated a number of after-action reports from the 2005 hurricane season to glean lessons learned that would have broad applicability for jurisdictions in the Gulf Coast region.

Exercises test emergency response capabilities and the performance and skills of the agencies and individuals. Sometimes, exercises and drills are designed to severely strain the current capabilities of the emergency response agencies to the point of failure to help identify potential gaps and weaknesses and ways to improve plans, operations, and training. These types of challenging exercises provide valuable lessons learned. Likewise, actual events provide insights into the capabilities and needs of emergency responders.

The identified lessons learned and corrective actions will be shared with the DHS Lessons Learned Information Sharing portal, and Corrective Action Program associated with the DHS National Exercise Program, to ensure that they influence ongoing Federal, State, and local government preparedness programs and planning activities.

### Lessons Learned and Best Practices

- ▶ **Lessons Learned** identify gaps, mistakes, or problems encountered that can or should be fixed.
- ▶ **Best Practices** are effective means that can be replicated in other jurisdictions. They are typically based on actual events and have been proven effective in the field.

In addition, the U.S. DOT's study benefited from several other recent governmental reviews on emergency response to Hurricane Katrina. This included the *Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina* by the U.S. House of Representatives; *The Federal Response to Hurricane Katrina: Lessons Learned* from the Assistant to the President for Homeland Security and Counterterrorism; the *Governors Task Force on Evacuation, Transportation, and Logistics* in Texas; and several reports by the GAO. These studies identified a number of lessons learned that were useful for this study.

## Chapter 4: State and Local Evacuation Plan Assessment

This chapter describes the results of the U.S. DOT's evaluation and assessment of the current State and local evacuation plans and operations in the Gulf Coast region. The U.S. DOT reviewed evacuation plans from each of the 5 Gulf Coast States (Alabama, Florida, Mississippi, Louisiana, and Texas) and 58 of the counties and parishes in these States. The assessment used a systematic, structured process to review the plans based on 20 questions concerning seven key elements of mass evacuation planning and operations. These elements are major types of activities or functions that Federal, State, and local emergency management agencies would conduct to plan and execute a mass evacuation. The development of the questions is discussed in Chapter III of this report.

The U.S. DOT's assessment identified the overall strengths and weaknesses of evacuation plans in the Gulf Coast region. The assessment provides a basis for Federal, State, and local governments to focus program enhancements in those areas most in need of improvements. The purpose of the assessment was not to rank plans for individual State and local jurisdictions, but to assess the overall status of evacuation planning in the region.

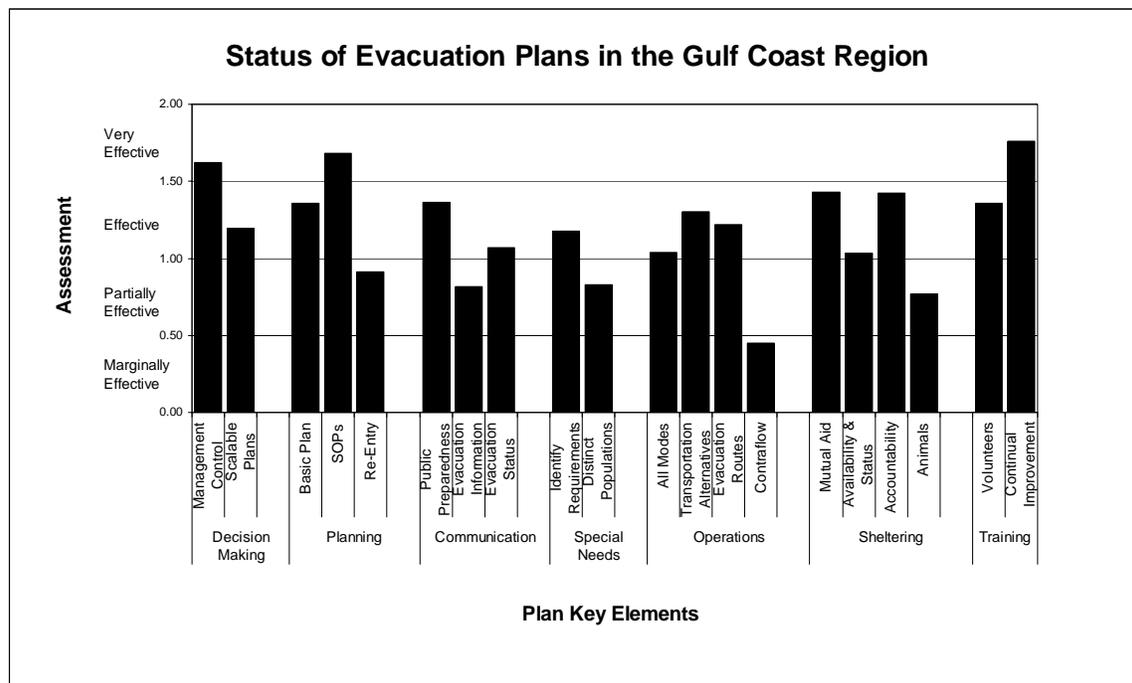
Figure 4-1 illustrates the overall status of evacuation plans in the Gulf Coast region, with respect to the seven key elements and the 20 questions that were assessed as part of this evaluation. The total scores for each question are averaged among the 63 State, county, and parish plans that were reviewed by the U.S. DOT. The purpose is to identify the areas where the plans are strongest and weakest. The assessment scores provide a benchmark for emergency managers and highlight areas that need to be enhanced and areas that are highly effective.

It is important to remember that this assessment of plans is a "snapshot in time." With each hurricane or other catastrophic incident, new challenges arise and lessons are learned. These lessons are then folded into the next update of Federal, State, and local plans, and the planning cycle continues—as it should. This assessment is based upon questions that are predicated on Federal planning guidance in place prior to the 2005 hurricane season, and the plans reviewed were generally in compliance with that guidance. This guidance addresses evacuation, but not mass evacuation from a catastrophic incident. Our experiences during the 2005 hurricane season are evidence that the guidance needs to be revised to reflect the demands of a mass evacuation, and that State and local plans must be updated to comply with that new guidance.

Additionally, this assessment focused on the written contents of the evacuation plans and not on the effectiveness of their execution during catastrophic incidents. Therefore, it is important to recognize that findings from this assessment may not reflect results from other studies that were conducted to assess the response to past catastrophic incidents, particularly to Hurricanes Katrina and Rita.

This assessment focused solely on one aspect of emergency management—evacuations, particularly in the Gulf Coast region. Again, it is therefore important to recognize that the assessment findings may differ slightly from those of other studies that looked at emergency preparedness in whole, such as the companion DHS report, or other studies such as the U.S. NRC report that presented case studies on 50 specific evacuations from across the nation that occurred before July 2003.

**Figure 4-1: Status of Evacuation Plans in the Gulf Coast Region**



The three areas in which the plans, as a group, were judged to be very effective are:

1. **Standard Operating Procedures (Planning):** More than three-quarters of the plans were found to be very effective in terms of requiring organizations to prepare *standard operations procedures* that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks.
2. **Exercises, After-Action Reports, Plan Updates (Training):** More than three-quarters of the evacuation plans were found to be very effective in terms of requiring *periodic reviews and updates of the plan, exercises, and after-action reports* as part of the planning process.
3. **Direction and Control (Decision Making and Management):** Three-quarters of the evacuation plans described *direction and control* procedures that were judged to be very effective with respect to mass evacuation requirements.

The five areas in which evacuation plans were weakest are:

1. **Information during Evacuations (Public Communications):** Nearly two-thirds of the evacuation plans reviewed were judged to be either marginally or partially effective regarding measures to keep *evacuees informed during evacuation*.
2. **Evacuating Groups with Various Special Needs (Special Needs):** A significant majority of the evacuation plans were judged to be either marginally or partially effective regarding provisions for *evacuating persons with various special needs*.
3. **Returning Evacuees to Their Homes (Planning):** A significant majority of the evacuation plans were judged to be either marginally or partially effective regarding provisions for *returning evacuees to their homes*.
4. **Contraflow (Operations):** More than three-quarters of the evacuation plans were judged to be only marginally or partially effective regarding the use of *contraflow operations*.
5. **Care and Protection of Animals (Sheltering):** Almost three-quarters of the evacuation plans were judged to be either marginally or partially effective regarding provisions to *care for and protect animals*.

Table 4-1 shows the assessment results for the 7 key elements and 20 questions.

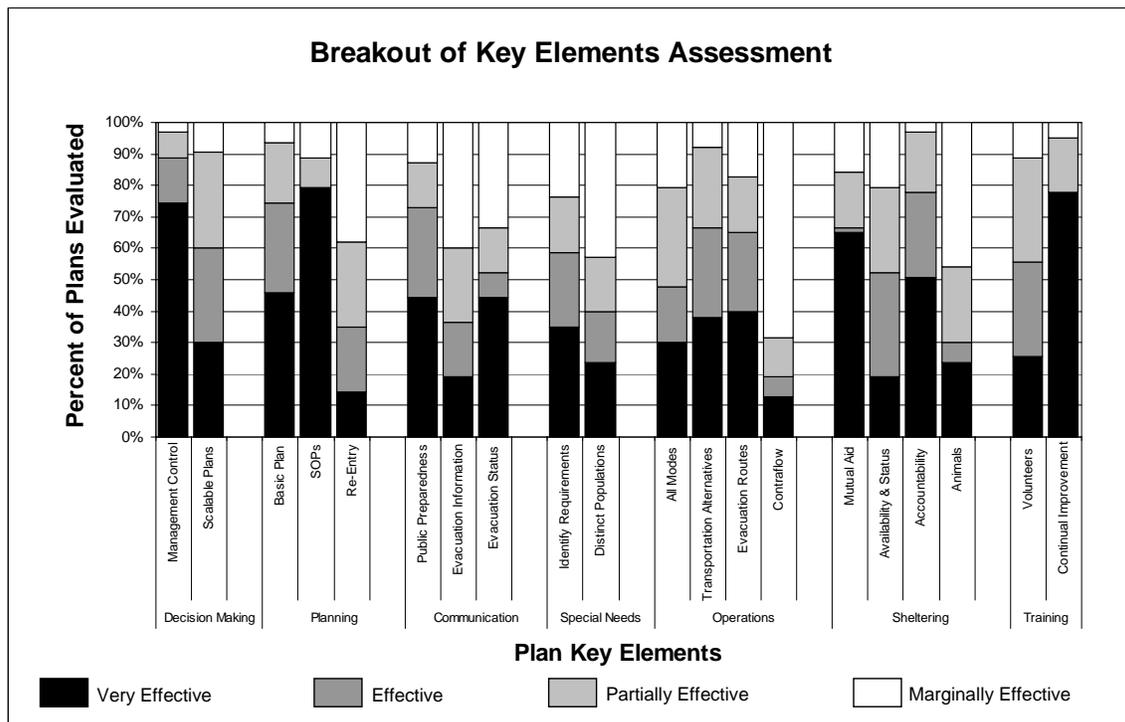
**Table 4-1: Questions and Assessment Results**

Decision Making and Management		
Assessment	Question	
	D1	Does the plan describe direction and control with respect to mass evacuation?
	D2	Does the plan describe the provisions needed to execute a large-scale evacuation?
Planning		
Assessment	Criteria	
	P1	Does the plan address evacuation planning considerations (i.e., decision making, communications, available transportation modes, special needs, and sheltering) with regard to catastrophic events?
	P2	Does the plan require organizations to prepare standard operating procedures that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks?
	P3	Does the plan include provisions for returning evacuees to their homes?
Public Communications and Preparedness		
Assessment	Question	
	C1	Does the plan describe the provisions and methods for alerting citizens that evacuation may be necessary?
	C2	Does the plan identify what will be done to keep evacuees informed during evacuation to reduce their level of mental and physical stress?
	C3	Does the plan describe the means the government will use to keep evacuees and the public informed on the specific actions they should take after evacuation has started?

Evacuation of People with Special Needs		
Assessment	Question	
	N1	Does the plan describe provisions for evacuating special needs populations including those in assisted living facilities, hospitals, and those living independently (e.g., people with physical, mental, cognitive, and developmental disabilities)?
	N2	Does the plan describe provisions for evacuating other special needs populations (e.g., people in schools, day centers, mobile home parks, prisons and detention centers as well as, people that do not speak English or who are tourists, seasonal workers, or homeless)?
Operations		
Assessment	Question	
	O1	Does the plan include provisions to ensure availability of public and commercial transport modes and necessary transport operators?
	O2	Does the plan describe the safe and practical transportation modes that will be used to move evacuees that cannot transport themselves (other than special needs populations)?
	O3	Does the plan identify evacuation routes?
	O4	Does the plan address the use of contraflow measures?
Sheltering Considerations		
Assessment	Question	
	S1	Does the plan require the establishment of mutual aid agreements with other jurisdictions to formalize access to and use of shelters?
	S2	Does the plan include provisions for informing shelter operations and evacuees about the locations of public shelters outside of the evacuation area and their status (i.e., full, accepting evacuees, accepting evacuees with pets, special needs shelters, etc.)?
	S3	Does the plan address strategies and responsibilities for shelter operations?
	S4	Does the plan include provisions for the care and protection of animals?
Mass Evacuation Training & Exercises		
Assessment	Question	
	T1	Does the plan include provisions for training a volunteer cadre to support shelter management operations, transport of evacuees, and first aid stations along the evacuation routes, etc.?
	T2	Does the plan require periodic reviews and updates of the plan, exercises, and after action reports as part of the planning process?

 Very Effective	 Effective	 Partially Effective	 Marginally Effective
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Figure 4-2 shows how the plan assessment ratings stack up for each question within the seven key elements.

**Figure 4-2: Evacuation Plans Assessment Ratings**

## Decision Making and Management

Decision making and management capabilities are critical to developing and implementing a successful emergency response plan. Managing the response to a catastrophic incident requires timely, effective decision making and a systematic management approach that applies sound, tested principles. SLG 101 highlights the significance of successful decision making and management throughout the life cycle of a disaster—“the manner in which the situation is managed will determine the effectiveness of the overall operation.”

The NRP indicates that when major catastrophic incidents overwhelm State and local resources, governments at all levels are encouraged to implement decision making and management plans in support of evacuation efforts. And while local and State governments and their emergency response organizations (e.g., law enforcement, fire, and emergency management) have plans and SOPs necessary to conduct emergency operations decision making and management, SLG 101 points out that catastrophic situations can easily overwhelm normal emergency operations since problems often arise in trying to manage operations involving disciplines, organizations, and agencies that are not accustomed to working together on a day-to-day basis.

The benefits of having plans and procedures in place for effective decision making and management include:

- Lines of authority and decision paths are clearly understood and readily applied

- Individuals and organizations know the essential information required for decisions and key management actions, and the procedures to share the information
- Information and analysis provide situational awareness for emergency managers, which facilitates timely and effective decisions
- Cross jurisdictional and cross organizational efforts are coordinated and synergized
- Resources are applied more efficiently and effectively.

## Current Guidelines and Practices

Decision making and management for a mass evacuation involves Federal, State, and local authorities. Under the NRP, a catastrophic incident triggers a comprehensive and integrated Federal, State, and local response. Numerous agencies from each level of government may be involved. The NRP describes the command structures and coordination processes for all of these agencies to work together. This decision making and management structure was discussed in Chapter II on the Federal, State, and local roles in evacuation planning and implementation.

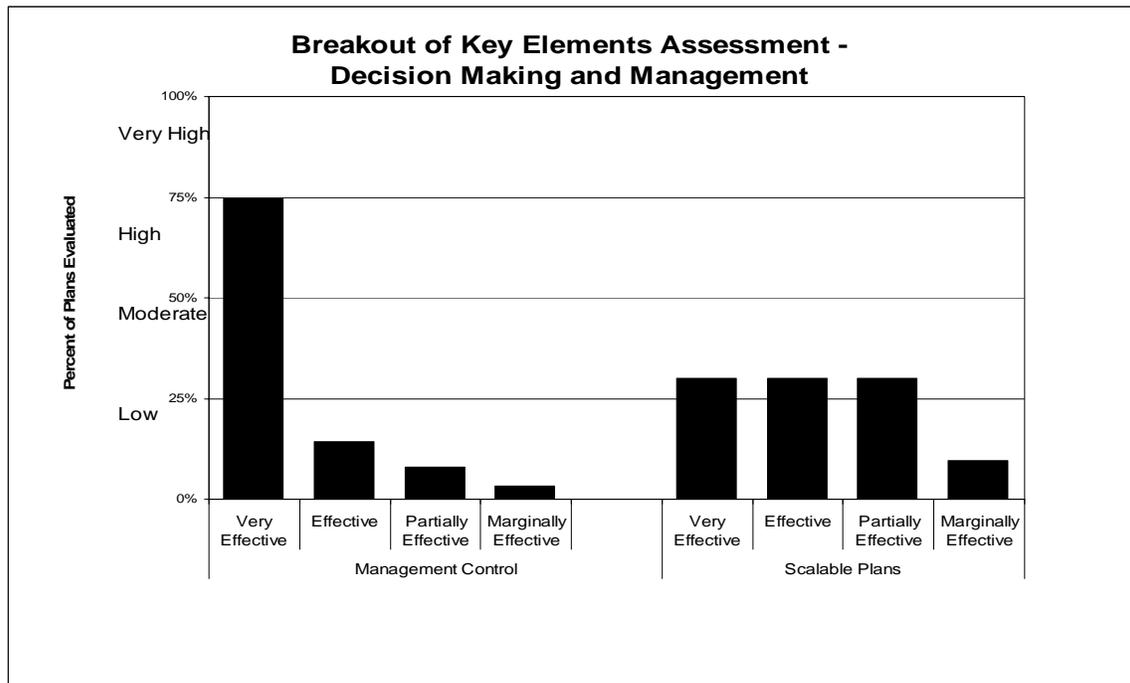
## Assessment of Current Plans

Two primary questions were used to evaluate how well the plans covered decision making and management requirements. The questions and results of the assessment are shown in Table 4-2. The evacuation plans in the Gulf Coast region generally were found to be effective or very effective in their treatment of decision making and management requirements under the current guidelines.

**Table 4-2: Decision Making and Management Questions and Assessment Results**

Decision Making and Management		
Assessment	Question	
	D1	Does the plan describe direction and control with respect to mass evacuation?
	D2	Does the plan describe the provisions needed to execute a large-scale evacuation?

Figure 4-3 shows the assessment ratings for the decision making key element, with breakouts provided for the two questions—management control and scalable plans.

**Figure 4-3: Decision Making and Management Assessment Ratings**

The first question assessed whether data are gathered, analyzed and provided to decision makers; how resources are assigned; how specific responsibilities are delegated to agencies and individuals; how coordination across agencies and levels of government is to occur; and how decision making and management responses will adjust to changing situations.

The second question concerns whether the plans describe provisions necessary to manage a large-scale evacuation. Considerations include whether procedures are in place to allow emergency managers to base decisions on changing risks, changing resources, and changing capabilities throughout the course of an evacuation; whether processes for issuing and revising evacuation orders are established; whether evacuation plans are time-phased to permit prioritized and tailored responses; and whether strategies are implemented to address securing evacuated areas as well as those with special needs.

The review found the plans generally include decision making frameworks necessary to implement large-scale evacuations, including requirements that agencies have SOPs. Most of the base plans and their annexes provide a significant amount of detail in terms of who, what, when, where, and how emergency tasks and responsibilities will be conducted. Tasks are identified and delegated to specific organizations. The plans also address the process for issuing and communicating evacuation orders.

In general, plans with high scores for the decision making and management key element identified each responsible position by name with a primary and back-up position. They also efficiently laid out communication channels and which agency to contact, depending on the issue at hand. Additionally, they provided a comprehensive and logical approach to managing the

identification, acquisition, and distribution of necessary resources—to include involvement of legal and financial authorities to comply with applicable accounting obligations. Lastly, they provided detailed checklists of actions throughout the evacuation process. For example, the State of Florida provides an evacuation decision worksheet that can be updated. The worksheet helps emergency managers and other officials go through a consistent decision making process.

On the other hand, plans with partial to marginal effectiveness scores generally lacked the specific detail of which agency and position would carry out the necessary actions involved. Many of the plans discussed evacuation procedures in very general terms and did not address the specific coordination at the field level that is necessary. Plans in this range did not effectively identify or link the roles and responsibilities of Federal, State, and local authorities.

As illustrated above, discussion of intra-governmental direction and control often articulated specific responsibilities, lines of authority, and means of coordination among the agencies within a jurisdiction. However, some plans lacked the same details for *inter*-governmental coordination—lines of authority, means of coordination, and specific responsibilities between agencies were often unclear.

The plans generally discuss the need to phase the execution of evacuations and provide some decision making information that emergency managers would need to make those decisions including numbers of people and vehicles and roadway throughput capacity. Some plans included checklists of various actions that should be taken based on the number of hours to landfall for different categories of hurricanes.

Law enforcement agencies are heavily tasked throughout each of the plans. They are typically responsible for managing the evacuation, providing traffic control, securing the evacuated area, controlling access, assisting with route clearance, providing shelter security, moving prisoners from jails, assisting in emergency public information dissemination, and conducting general law and order operations. The SOPs from the law enforcement agencies are generally not included as part of the evacuation plans, and were not available for this review.

Most plans provide estimates of the number of citizens that would evacuate in privately owned vehicles. However, the majority of plans do not contain estimates of the number of people requiring transportation assistance, including people who do not have access to a privately owned vehicle and people with special needs who rely on public transportation to evacuate. This information is needed for decision makers to effectively coordinate public transportation resources for an evacuation and to ensure transportation assets will be sufficient to evacuate special needs populations in time.

There were several other areas where plans could be strengthened. Many plans do not include contingency plans, strategies, or processes to change activities based on changing factors in the disaster. In addition, many of the plans do not contain procedures for revising or amending evacuation orders, nor do they contain pre-approved drafts of executive orders for evacuation. Having draft orders and documents helps clarify authorities and may facilitate more timely evacuation decisions in the turmoil of a catastrophic incident. The Palm Beach County, Florida

plan includes such a draft evacuation order. The appropriate official may quickly fill in the blanks to issue the order.

## **Lessons Learned from Recent Evacuations**

**Decision to Initiate Contraflow Operations:** While some officials indicated that regular highway operations should be continued as long as possible to minimize disruption, the general consensus is that contraflow operations on major highways work well and facilitate evacuations. Still, recent experiences indicate that implementing contraflow operations was less than optimal because, in some jurisdictions, decision makers did not know how long it would take to deploy resources necessary to initiate contraflow operations. Contraflow is a relatively new strategy, and continued analysis and investigation is needed.

**Flexibility:** There were several instances when communication networks were out of service and local, State, and Federal agencies could not reach each other, despite efforts to utilize all available methods. When in this situation, officials and emergency managers must balance adhering to the plan, which may require coordination with unreachable colleagues, with serving the needs of their jurisdiction in an information vacuum. Effective plans anticipate this issue with contingency plans and flexibility to adjust to dynamic situations.

## **Best Practices**

The Texas Task Force on Evacuation, Transportation and Logistics was created in 2005, in direct response to the evacuation concerns brought upon by Hurricanes Katrina and Rita. With the increased attention on the Gulf Coast States, events took place that defined the lessons learned and recommendations to better address evacuations and all things included like transportation and logistics. The Texas Task Force focused on five key areas in the final report including command, control, and communication; evacuation of people with special needs; fuel availability; traffic flow; and public awareness. These areas were identified most often during a series of public hearings. The final report was released on February 14, 2006, and just recently Texas Governor Rick Perry announced the Executive Order RP57. This executive order has led to the implementation of some of the Texas Task Force recommendations, and is an early step in the process to clarify the decision making and management structure and processes in Texas.

## **Planning**

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State and local EOPs for mass evacuation are the “roadmaps” for how the emergency management agencies will help people in their community leave an unsafe area. The plans evaluate the risks for the community, describe the information emergency managers need to execute an evacuation, determine what actions will be taken and who will carry out those actions, and discuss strategies and alternatives if events do not go as anticipated. Plans are updated periodically to reflect new hazards, address changes in the community, and incorporate improvements learned from exercises and real events.

An evacuation plan is much more than a written document; it is the outcome of a planning process. A plan for a mass evacuation from a catastrophic incident cannot be created by one agency. Plans for a complex, multi-jurisdictional disaster require coordination and integration of plans with partner Federal, State, and local agencies as well as NGOs and the private sector. Evacuation plans that are integrally linked with the plans of supporting agencies must be updated regularly to reflect changes in capabilities and resources of the partners. The process of working with partner agencies to assess risks, develop strategies and contingencies, and exercise and test plans is a very important part of the process. It builds effective working relationships among agencies and managers and shares the knowledge and expertise across many disciplines. With the Federal, State, and local emergency management agencies adopting the ICS and following similar planning guidelines, this coordination becomes easier because the agencies “speak the same language.”

*“Plans are nothing;  
planning is everything.”*

Dwight D. Eisenhower

## **Current Guidelines and Practices**

SLG 101 is used by many State and local jurisdictions to help develop their EOPs, including evacuation planning. SLG 101 recommends a planning process that builds on the jurisdictions’ existing plans; includes a hazard and risk analysis to establish priorities; and includes a broad range of public, private sector, and volunteer organizations that will be involved in a mass evacuation. SLG 101 includes a Functional Annex that specifically addresses evacuation planning and a Hazard-Unique Planning Considerations Annex that addresses hurricanes.

Both SLG 101 and the NRP promote collaborative planning processes across jurisdictions, with different levels of government, and among agencies. SLG 101 notes that many jurisdictions mirror the Federal plans including establishing the same ESFs for State agencies. The NRP provides information that will help States and local jurisdictions ensure their plans link up easily with Federal resources in a catastrophic incident.

Another important source of planning information for State and local jurisdictions are HES conducted by the USACE, FEMA, and the NWS. These studies provide survey and analysis of surge and evacuation zones, behavioral studies, shelter analysis, and transportation analysis. This information is used by local emergency management officials to update and improve their evacuation plans. These agencies, and others, have also developed a number of models that assist in evacuation planning and decision making. These models are described in the following section, and more detail is provided in Appendix F.

**Hurricane Evacuation Models.** Over the past four decades, and especially since 9/11, researchers and emergency management personnel have sought to better understand and predict the characteristics of evacuations. This research has led to the development of models, which have contributed to planning for and executing evacuations. Information from these models provided to decision makers and managers of evacuations are highlighted below. The first five hurricane models or applications are operational tools, while the last three models or applications are analytical tools geared specifically for transportation modeling and analysis.

### *Operational Modeling Tools*

**SLOSH Model (Sea, Lake, and Overland Surges from Hurricanes):** For a given set of storm conditions, this model from the NWS predicts storm surge and is used to help plan evacuation routes and locate emergency shelters based on estimates of the extent of flooding.

**HURREVAC (Hurricane EVACuation):** Developed by USACE for FEMA, this model tracks and projects the course of an approaching hurricane and projects the anticipated course once it makes landfall. It draws on SLOSH model information and other sources and is used to help determine when to commence evacuation of an area.

**HAZUS-MH (Multi-Hazards U.S. Software):** Developed by FEMA, this tool predicts the impacts of disasters to buildings and structures from various hazards. Managers can use this model to gauge the physical safety of shelters in different categories of hurricanes and estimate the number of people that may need shelter.

**CATS (Consequence Assessment Tool Set/Joint Assessment of Catastrophic Events (JACE):** Developed by the Defense Threat Reduction Agency with guidance from FEMA, CATS integrates an array of information to provide disaster analysis in real time. CATS helps estimate damage and assists emergency managers to develop mitigation strategies.

**ETIS (Evacuation Traffic Information System):** Developed by the U.S. DOT in collaboration with FEMA, ETIS combines behavioral studies, data from past occurrences, and real-time data such as traffic incidents, weather information, evacuation percentages, and tourist occupancy rates to monitor highway evacuation processes.

### *Analytical Modeling Tools*

**NETVAC (NETwork emergency eVACuation):** This model provides limited analysis for evacuations to analyze route selection, intersection controls, and lane management.

**MASSVAC (MASS eVACuation):** This is a simulation model of highway networks to identify routes to the nearest shelters and to calculate evacuation time.

**OREMS (Oak Ridge Evacuation Modeling System):** OREMS is a probabilistic model that uses large amounts of highway network information combined with local data for a systems approach to evacuation operations.

Of the eight models reviewed, no one model or application is designed to meet all planning and emergency evacuation requirements. However, many of the models have common functionality, data input requirements, and the ability to modify a “baseline” or default model run setting or scenario. A significant difference in model applications is the distinction between planning for an event (e.g., hurricane) versus responding to an incident (e.g., earthquake or man-made disaster), with the variable of time for planning and response. Depending on the type of evacuation requirement, different models and their data inputs, functionality, and resulting decisions may vary significantly. However, many communities are faced with both requirements

for planning for community safety and continuity of government operations. Therefore, many government organizations will need access to or the results of these different models for both planning and response.

**Costs of Evacuation Plans:** One of the factors Congress requested this study to assess is the cost of evacuation plans. The U.S. DOT attempted to collect cost information for the Gulf Coast States, but specific cost information was generally not available. The limited cost information received for this study was incomplete and of limited value for analysis.

State officials reported that determining the amount of funding allocated and spent for evacuation planning and implementation would be difficult since funding comes from many sources at the Federal, State, and local level, and many agencies within the various levels of government have agencies involved. The States do not budget specific amounts for evacuation planning, but include these costs within broader emergency management programs. While State officials reported evacuation planning is done within current funding, they felt that funding was constrained. However, they did not identify specific activities that were limited by lack of funding.

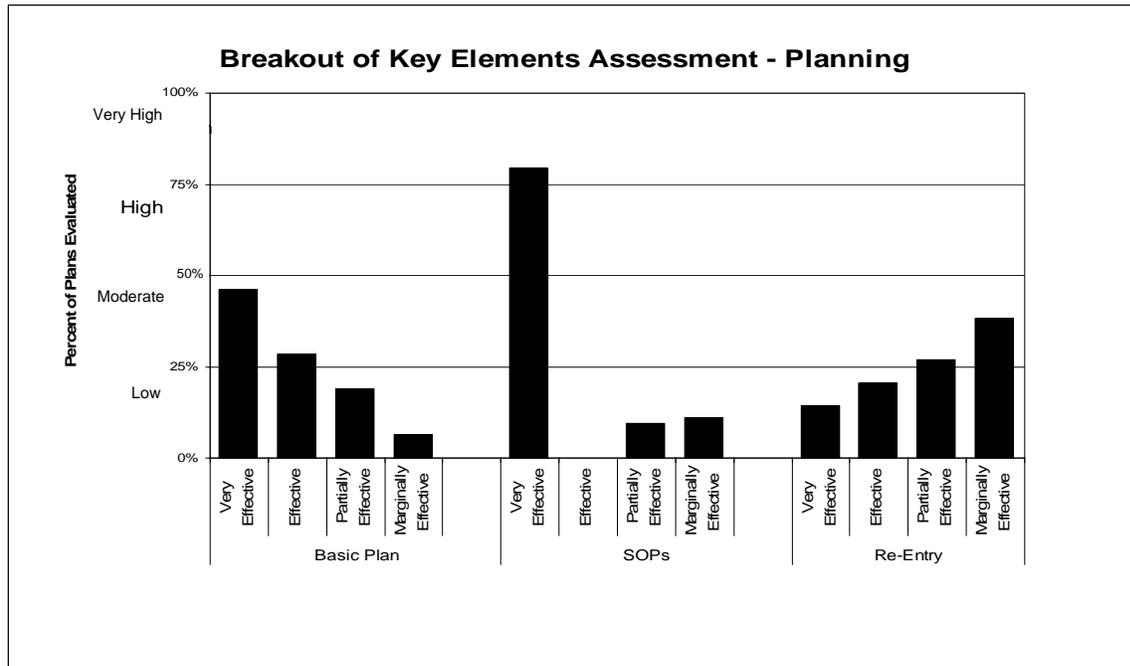
### Assessment of Current Plans

The three questions used to assess general planning elements of State and local evacuation plans in the Gulf Coast region are shown in Table 4-3.

**Table 4-3: Planning Questions and Assessment Results**

Planning		
Assessment	Question	
	P1	Does the plan address evacuation planning considerations (i.e., decision making, communications, available transportation modes, special needs, and sheltering) with regard to catastrophic events?
	P2	Does the plan require organizations to prepare standard operating procedures that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks?
	P3	Does the plan include provisions for returning evacuees to their homes?

Figure 4-4 shows the assessment ratings for the planning key element, with breakouts provided for its three questions—basic plan, SOPs, and re-entry.

**Figure 4-4: Planning Assessment Ratings**

The first question includes a broad range of planning considerations that should be addressed in an evacuation plan. These planning considerations include prioritizing communities for evacuation based on risks; estimating the number of people and vehicles to be evacuated, including people with special needs and those without their own transportation; identifying decision points for implementing an evacuation based on different hazards; estimating the time needed to complete evacuations of different types and scales; estimating how far evacuees will have to travel to safety; and coordinating with other agencies and jurisdictions that may be involved in the evacuation including those that will shelter evacuees.

The second question concerns whether participating organizations are required to develop standard operating procedures with detailed instructions on how the plan will be implemented and who is responsible for specific tasks. Standard operating procedures tell agency staff how to implement various parts of the evacuation plan and help to ensure that important details are not overlooked.

The third question concerns whether evacuation plans include provisions for returning evacuees to their homes and connecting family members separated during the evacuation process. These aspects of evacuations can be among the most stressful; having procedures in place to address these issues can help reduce the stress and tensions associated with these troublesome aspects of evacuations.

Overall, the plans in the region were generally found to be effective in addressing the broad range of planning considerations associated with evacuations in current guidelines. In general, plans with high scores for this key element included a very proactive approach to the evacuation

process. This would include identification of evacuation zones by zip code, pre-scripting evacuation time lines to identify key decision points, and conducting mitigation hazard assessments to identify the most vulnerable areas in varying jurisdictions. These plans also establish a Missing Persons Unit immediately after the plan activates, and contain pre-scripted re-entry messages to assist the coordination of citizens returning.

The strongest part of plans is their recognition of the importance of SOPs to implement the evacuation plan and assign specific tasks to individuals. Some of the plans, however, do not include sufficient details such as estimates of the numbers of evacuees and vehicles, distance and travel time to designated shelters, capacity of evacuation routes and modes of transportation, contingency plans, and sufficient provisions for returning evacuees to their homes. Some local governments in low-lying areas at higher risk for flooding do not include decision points or criteria for when to implement an evacuation. Others do not specify the organizations tasked to prepare and maintain the plans and procedures for mass evacuation.

Although the majority of State and local plans have provisions for contraflow operations, some do not identify a system in their plans for communicating and coordinating contraflow operations with neighboring jurisdictions or demonstrate that the contraflow plans have been tested in an exercise or in a real evacuation.

The States of Louisiana and Mississippi have worked together to develop contraflow plans on I-55 and I-59 to be used if a hurricane rated as Category 3 or higher is moving in the direction of greater New Orleans. There are five Levels in the plans with Levels 1 through 3 being preparedness related. Level 4 is the actual operation of contraflow only within Louisiana, and Level 5 is contraflow operations within both States. The two States have an agreement on notification timeframes prior to the implementation of contraflow operations to ensure both States have the appropriate resources in place.

Most attributes associated with planning for re-entry of the population after a disaster are not adequately addressed, and plans generally were judged to be only partially effective with respect to this question. In a few cases, the re-entry section of the plans state that it must be conducted with the same level of care as the evacuation, but the plans did not provide information or procedures, or assign responsibilities to agencies to accomplish this task. Processes and procedures to help reunite evacuees with family members separated during the evacuation have also not been adequately addressed.

The decision to re-enter an area that has been impacted by a hurricane is based on public safety factors. Decision makers must be assured that the impacted area is safe for residents and business owners to return. That requires State and local agencies to inspect the areas and aid any victims of the storm, move debris to open roadways, handle downed power lines, and other such actions. These activities take time, and this has an impact on how long people need to remain in shelters or in the location in which they sought refuge.

Some of these factors are particularly critical for special needs evacuees who may need power to run medical equipment on which they depend or the elderly who may need air conditioning to avoid heat-related medical problems. Mississippi Department of Health Officials noted that this

is something that they are working to address during the revision of their mass care plans. The Florida Legislature has taken up legislation to allow for reimbursement for the purchase of generators by nursing homes that may end up sheltering evacuees from another location.

It is likely that an area impacted by a hurricane will have zones with varying degrees of impact. That means the re-entry process may happen in phases as each geographic area is deemed safe for evacuees' return. After Hurricane Rita, Texas implemented a phased re-entry plan that was very successful. Officials determined which geographic areas could return and set a timetable during which each area could be re-entered. The phases were well reported by the media. This phased approach worked well in avoiding the major traffic jams that occurred during the evacuation for the same hurricane.

## **Lessons Learned from Recent Evacuations**

**Current evacuation plans are not sufficient for mass evacuations from catastrophic incidents.** The plans assessment revealed that, in general, the States followed the Federal guidance in preparing their evacuation plans to address all hazards, including natural, technological, and/or national security emergencies or disaster situations. However, Hurricanes Katrina and Rita were catastrophic incidents that involved extraordinary levels of mass casualties, damage, and disruption, and overwhelmed the Federal, State and local responders. The results of the evacuations for these two hurricanes clearly demonstrated the need for more detailed planning for evacuation management and control, contingency plans, better estimates of transportation needs, and planning processes to ensure coordination and integration of resources and capabilities of government agencies at all levels. Therefore, this study established the fact that there is a huge gap between the current evacuation plans, and the execution of these plans to carry out mass evacuations in response to catastrophic incidents.

**Evacuation plans are fragmented.** Evacuation plans for a region are spread among a “family of plans.” These include plans, supplements, and annexes from various agencies and jurisdictions that contain different levels of specificity and different organization of topics. It was challenging for the U.S. DOT to assemble all of the evacuation plans for this study because components of the evacuation plans were in many different agencies' plans. It is also difficult for State and local emergency planners to assemble all of the important evacuation elements from the various agencies. In addition, it is difficult for planners and operational staff to assess whether all of the pieces of the plans work together and are in coordination with the plans of other jurisdictions.

**No national evacuees database.** Re-entry planning should be done well before a disaster to avoid trying to develop the plan as emergency response operations are still ongoing. During Hurricane Katrina's landfall, Mississippi's EOC phone systems jammed due to thousands of phone calls by people trying to locate family members and friends. In the days following Katrina, additional phone lines were added to handle the call volume. Volunteers staffed the phone lines and began a missing persons database system. According to the Mississippi Emergency Management Agency (MEMA) Executive Director's Congressional Testimony relating to Katrina response, the missing persons hotline took more than 10,000 calls from 35 different countries. There was no national system in place to identify people in shelters, missing

people, or people who have been located and are safe. This was a national problem because this was a multi-State event and disaster victims were displaced in many States.

## **Best Practices**

**Coordination between Local, State, and Federal Agencies.** The planning processes of State and local agencies usually include coordination and integration of State and local jurisdiction plans. In a mass evacuation from a catastrophic incident, Federal resources and capabilities will be an important part of the States' emergency response. There was very little discussion in the plans of how the States should coordinate with appropriate Federal agencies and resources. The State of Mississippi has a very comprehensive emergency management law that outlines roles and responsibilities of State and local jurisdictions for implementation of the Governor's authorities during emergencies and disasters. This law makes MEMA responsible for the emergency operations plan and tasks the agency with oversight of all emergency plans at the State and local level. Under this law, MEMA is given the responsibility and accountability to work with agencies at the State and local level involved in emergency management to work toward compliance with the state CEMP and the NRP. The law also requires that plans include an evacuation and shelter component, a disaster response and recovery component, use of the National Guard, communication and warning, training and exercises, and urban search and rescue. County emergency management offices are required to establish a communication capability at the local level to ensure adequate flow of information during times of emergency. The framework of this law is an important step; similar coordinated planning processes are needed between the States and the appropriate Federal agencies for mass evacuations.

The Mississippi and North Carolina Departments of Health (DOHs) have been working together in support of response to disasters for years. Following the devastation of Hurricane Katrina, the two DOHs decided to take this relationship to the next level—representatives from North Carolina are conducting the after-action report for the Mississippi DOH for ESF-8 (Health and Medical Services). The findings from the after-action report will be incorporated into its plans as the report is available. This example of peer review also demonstrates the mutual aid that has continued since Katrina as the States directly affected and the States who have assisted all want to identify and plan how they will operate more effectively during future disasters.

## **Public Communication and Preparedness**

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Even the most comprehensive evacuation plans are only as good as their ability to help inform public agencies of when and what to communicate to the public. In general, the evacuation plans should contain provisions relating to public communications before evacuations and during evacuations, ensuring people evacuate safely. Plans that successfully accomplish this goal are able to develop targeted messages geared towards specific audience(s) that impart information to that group in a manner that allows them to receive and apply the message(s) or information. Moreover, when the message(s) being communicated contains information that will protect and prepare people for a significant event, such as a hurricane evacuation, it is that much more critical to provide citizens with the tools and access to information that will make them and their families safer and more secure.

## Current Guidelines and Practices

The NRP addresses the types of public communication that are essential during all phases of an evacuation. The NRP discusses the need to educate the public before an event about evacuations, sheltering, preparedness kits, public health, and safety issues. The NRP also speaks to public information during an evacuation, such as evacuation routes, estimated travel times for an evacuation, public transportation options, location of staging areas, location of shelters, evacuating family pets, and informing those with special needs. The NRP additionally addresses recovery communications, informing the public on transportation infrastructure and access to the impacted area, security initiatives in place to protect their evacuated property, and the status and timing of plans to return home, as well as the importance of coordinating with local media outlets to disseminate evacuation information.

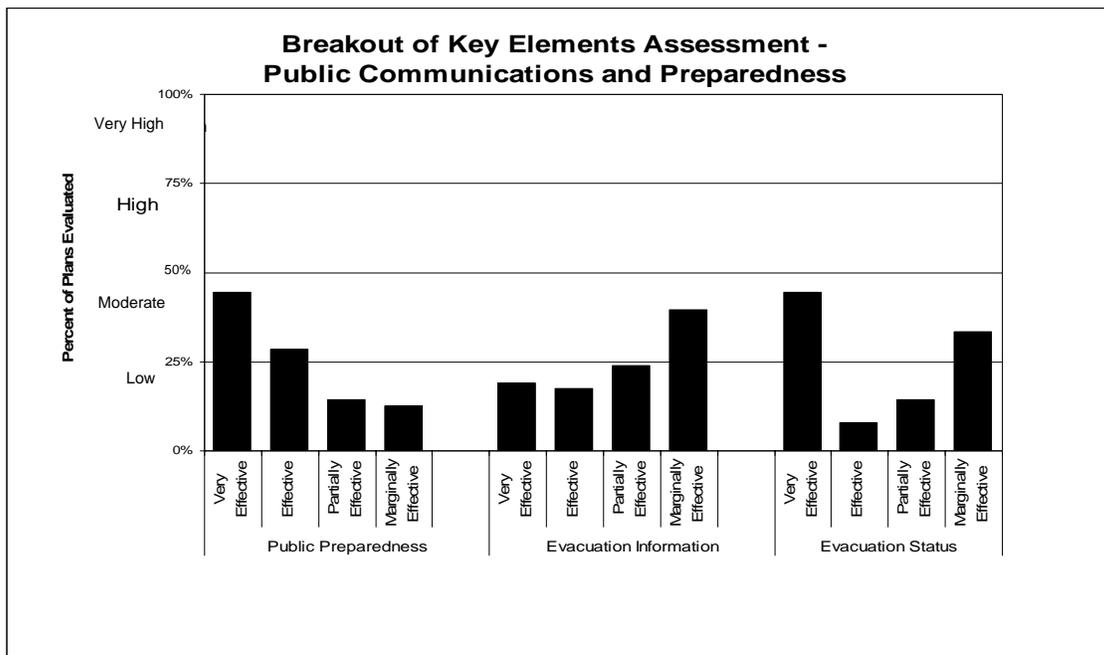
Additionally, the Emergency Public Information (EPI) Attachment to SLG 101 contains guidance on providing the public with accurate, timely, and useful information instructions throughout the emergency period and recommends that EPI organizations develop close ties with local media to ensure message dissemination to the public.

State and local evacuation plans were evaluated against three main questions associated with Public Communications and Preparedness. The questions and the results of the assessment of the plans are summarized in Table 4-4.

**Table 4-4: Public Communications and Preparedness Criteria and Assessment Results**

Public Communications and Preparedness		
Assessment	Question	
	C1	Does the plan describe the provisions and methods for alerting citizens that evacuation may be necessary?
	C2	Does the plan identify what will be done to keep evacuees informed during evacuation to reduce their level of mental and physical stress?
	C3	Does the plan describe the means the government will use to keep evacuees and the public informed on the specific actions they should take after evacuation has started?

Figure 4-5 shows the assessment ratings for the communication key element, with breakouts provided for its three questions—public preparedness, evacuation information, and evacuation status.

**Figure 4-5: Public Communications and Preparedness Assessment Ratings**

The first question concerns how well plans describe provisions and methods for alerting citizens that an evacuation may be necessary. Specific factors that plans should address in connection with this question are when and how the public should be informed that evacuations may be necessary; contingency plans in the event that standard means of communications are unavailable; communication plans to inform those with limited English language proficiency; communications with various special needs populations; and transportation-specific information such as estimated travel times, alternate evacuation routes, and modes of transportation.

The second question concerns how well plans address needs for communications during a hurricane evacuation. Specific factors considered include communications with evacuees concerning traffic conditions; the availability of food, water, restrooms, and other services along evacuation routes; and the location and availability of shelters along evacuation routes including shelters that accept pets and persons with special needs. Factors also include the extent to which those on public transportation are kept adequately informed of their destination, arrival time, the availability of shelters, and other vital information they need to know.

The final question concerns the extent to which plans describe specific methods that public agencies use to communicate information to the public during an evacuation. Without this detail, it is difficult to assess whether communication plans are likely to be successful and whether information will be up to date and thus useful in a very dynamic environment. Among the methods that would be most effective are variable message signs along the highway, highway advisory radio, and 511 service.

## Assessment of Current Plans

Overall, evacuation plans in the Gulf Coast region are inconsistent in terms of communications with the public before and during an evacuation. Generally, plans are strongest in providing pre-evacuation information to residents about evacuation routes, sheltering locations, and other essential information households need to know before they evacuate. Plans are weakest in what information will be communicated to the public during an evacuation and how that information will be communicated. To some extent this was to be expected, as circumstances are prone to change while an evacuation is underway and traditional methods of communication are often unavailable.

**Public Communications and Preparedness Before an Evacuation:** Assessment of this question showed that the majority of the plans included provisions, such as pre-written media messages, for timely communication of evacuation instructions to prepare citizens in advance of the order to evacuate. For example, the Collier County Florida plan states that the county maintains a listing of camera-ready public service announcements to keep evacuees informed.

More than half the plans reviewed also identified the use of alternate means for communicating with the public, such as reverse 911 systems that automatically call certain people to notify them of an emergency. Nearly half of the plans included provisions for communicating with people that have limited English proficiency. Some of the means identified are specialized phone services such as the pre-recorded audio and video tapes, publications in Spanish, media, bilingual outlets, and door-to-door public addressing.

The majority of the plans identified provisions for communicating with evacuees that have special needs (people that are hearing, vision, physically impaired, etc.). For example, the Indian River County, Florida plan calls for the use of a Telecommunications Device for the Deaf (TDD) by the County during an evacuation. Plans should address the need for providing current information that is tailored to the specific needs of various groups having special transportation, sheltering, and evacuation needs.

The assessment also highlighted some weak areas within this area. Only a very limited number of plans contained sample public information messages for use in times of evacuations. The majority of plans did not address informing the public about alternate transportation modes, alternative evacuation routes, and estimated travel times. Previous evacuation experiences indicate that residents are often under-informed about the best evacuation routes, are unaware of alternate routes, and face added frustration by being misinformed about the amount of time that an evacuation might take. The U.S. DOT found that most of the Gulf Coast States and counties provide information about evacuation routes on their public Web sites. While this method of public information is very useful for pre-evacuation preparedness, it is not the ideal method for providing public information during evacuation since a majority of evacuees would not necessarily have Internet access while en route.

**Public Communication During an Evacuation:** Within the key element of Public Communication and Preparedness, plans were judged to be weakest with respect to the second

question—providing evacuees with information during an evacuation. Nearly all of the plans lacked consistency in the type of information provided to the public during an evacuation.

Overall, many of the plans did not address details pertaining to informing evacuees of available transportation modes, access to these modes, and any restrictions on what evacuees may carry with them when traveling on these modes. The plans also did not include provisions for informing evacuees about when transportation assistance will begin and end and the frequency of departure at designated pick-up locations. In addition, the plans did not establish times for public officials to provide updates, and about informing the public on when to expect such updates. The plans did not address provisions for communicating security measures to the public. The plans did not address provisions for one of the critical attributes—informing evacuees of their destination before boarding public transportation.

Most plans did not address details pertaining to providing the public with information about available services along evacuation routes and at shelters. One exception is the Hillsborough County, Florida Host County Shelter Plan. It describes how the county is a potential destination for large numbers of evacuees from disaster situations in other parts of Florida. Under such a scenario, Information Centers for incoming evacuees would be set up along, or near, highways at the approach ends of the county. The Florida Department of Transportation's dynamic message signs (DMS) would be placed at key places on the inbound highways directing evacuees to the Information Centers. Lodging information, provided by the Tampa Convention & Visitors Association, and shelter information will be provided at the Information Centers. Public shelters sufficient to meet the demand will be opened as needed as close as possible to the Information Centers. Communicating essential information to those evacuating, including alternative evacuation routes, changes in weather conditions, upcoming service areas, and availability status of shelters, can help avoid problems associated with motorists running out of fuel; being unable to find food, water, restrooms, and other services; wasting time and fuel going to shelters that are already full; and many other issues associated with a lack of information.

Past experiences tell us that not having information on *any* of the above factors can easily manifest itself in the form of mental and physical difficulties among evacuees. The plans should recognize that evacuations can be extremely stressful and that information on the above factors known to be of concern to different groups of evacuees can help reduce stress. One way that the government is responding to the development of depression and post-traumatic stress syndrome among victims and first responders is through the HHS' Substance Abuse and Mental Health Services Administration (SAMHSA) and the Ad Council's Hurricane Mental Health Awareness Campaign. This campaign provides both radio and television public service announcements encouraging the treatment of these issues.

**Means of Communicating with Evacuees:** The primary finding under this question was that nearly all of the plans lacked details on the means of communicating real-time evacuation status information to the public. While a few plans indicated the use of emergency radio announcements for reporting highway conditions to the evacuees, most plans did not address the use of ITS to support emergency transportation information. Some of the ITS tools for this purpose include the nationwide 511 travel information phone number, DMS along evacuation routes, highway advisory radio (HAR) announcements, and travel information Web sites. Each

of these tools, if implemented properly, could significantly improve evacuation-related communication to the public, both before and during evacuations.

## Lessons Learned from Recent Evacuations

### **Better Public Information on Risks and**

**Responsibilities:** The public is often confused by evacuation information and unable to make informed decisions on evacuations. Different terms are used to order an evacuation (i.e., mandatory, voluntary, recommended, partial, and full), and the public may not know when to properly respond to the order. People often do not understand storm surge. They are focused on the category of the hurricane and the wind speed, but not the storm surge. People often do not know if they are located in storm surge areas and are at higher risk for flooding and should evacuate. Others may evacuate unnecessarily and cause additional congestion. Similarly, some local meteorologists may make different predictions on the level and path for a hurricane than the National Hurricane Center. This information will be more critical in future hurricane seasons with large numbers of people still housed in FEMA trailers that are more vulnerable to high winds.

*"The fear is mostly from flooding, from tidal surge. There were estimates that showed the storm would put five feet of water throughout the center if they had a 22-foot storm surge."*

A NASA spokesperson describing the potential damage to the Johnson Space Center if Hurricane Rita made a direct hit to the Galveston/Houston area.

**Coordinated, Frequent and Accurate Information to the Public:** During an evacuation, the government must recognize that the media can be both a partner or a constraint. One New Orleanian with whom the evaluation team spoke described the impact of local radio stations on his contraflow experiences last summer. As he made his way from New Orleans to Houston before Katrina's landfall, he praised the Baton Rouge radio stations that provided rush hour traffic updates even though it was the weekend. Although he was moving slowly, he and his family knew what was happening in terms of traffic flow.<sup>36</sup>

However, when he attempted to leave Houston for Rita, the local radio stations reported on the problems but did not provide much usable information. He eventually returned to his temporary home in Houston to ride out the storm. While this is only one experience out of millions, it does show that even when local, State, and Federal officials do everything within their means to provide information to the public, the government is also reliant on outside sources, such as the media, to act responsibly.

**Cultural Differences:** Effective communication is not limited to ensuring people receive the information. Disseminators of public information must also be aware of different cultural groups in a community and their norms for responding to emergencies. For example, when it comes to evacuation, many people who are from an island, like those in the Caribbean, are used to seeking higher ground when a big storm comes—there simply is no where else to go. However, once they move to the mainland, this evacuation strategy may not fall into line with what is the best course of action for their new community or home.

## Best Practices

The Terrebonne Parish Readiness and Assistance Coalition (TRAC) was born out of a call to action in response to Hurricane Andrew in 1992. As this community pulled together to help rebuild and raise homes for those in need, the founders of TRAC, 28 community organizations including emergency management, religious groups and hospitals, partnered to prepare and educate area residents. Ninety percent of the Parish is wetlands or covered by open water. Many of the people in the area live in poverty and have language barriers. Today, TRAC serves 21 parishes throughout southern Louisiana through a comprehensive public education campaign that includes print, television, radio, Web, and personal education and outreach. Updated in 2005 (prior to Hurricane Katrina), each part of the campaign reminds Louisiana residents that they must be prepared for hurricanes and corresponding evacuations. Much of the information that TRAC provides its residents could be used as baseline information for other disasters and by people who live in other parts of the country. It does not differ significantly from publications like FEMA's *Are You Ready?* What TRAC does is convey the risk associated with hurricanes in the context of Louisianans' geography and attitudes. This includes describing the long history of devastation and destruction of hurricanes in the State, including the storm Chenier Caminanda of October 1893 and Betsy in September 1965. TRAC also recognizes the geographic changes of Louisiana in recent years, explaining to residents that the Gulf is much closer to them and their homes than it was in the past. The combination of these elements into TRAC's campaign drives home the message that many of the things that make Louisiana unique in a positive way, also put it at increased risk.

To educate residents on hurricane preparation, public and private entities have developed information materials. As an example, Louisiana's "Make a Plan Campaign" denotes personal responsibility and education. In addition, DHS' Ready.gov tells people how to make emergency plans and kits, and local Red Cross chapters administer education campaigns to educate the public. During a storm, information is conveyed through various sources of media. Louisiana communicates hurricane information differently depending on the parish in which one resides. Some notification will occur over radio, television, an Emergency Information Line, and on roadside messaging machines. Additionally, some parishes go street to street with megaphones announcing evacuation information to its residents. Printed information is currently available in English, and the State and parishes are working on additional translated information and classes in Spanish and Vietnamese.

Local and State governments are also utilizing existing resources, like 311, 211, and 511 information systems, to provide information to residents before, during, and after disasters. Miami-Dade County 311 service operators are trained to provide up-to-date information on a wide variety of issues ranging from standing evacuations to the areas that are under boil water orders. While waiting to speak to an operator, residents listen to a recording informing them about preparedness information and joining the local Citizen Corps and Community Emergency Response Team (CERT). The State of Texas is launching a new 211 service on May 1, 2006, that will allow residents and visitors to call in if they need a ride or other assistance with an evacuation. Florida's 511 travel information telephone service allows the State DOT to provide information about current traffic and travel conditions to callers. In addition, the 511 system can be used to provide area-wide alerts, warnings or emergency information to all callers.

During the 2005 Hurricane Season, the affected States coordinated messages across State boundaries so that motorists would know about closures, other travel restrictions, and detours where reasonable alternatives were available. For example, signs in Texas alerted motorists to closures in Louisiana. Alabama deployed portable dynamic message signs near Mobile, Montgomery, and Birmingham to alert motorists to closures and restrictions along the Gulf Coast highways into Mississippi.

## **Evacuation of People with Special Needs**

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A key population to address in evacuation planning and implementation is people with special needs. In Hurricanes Katrina and Rita, people with special needs often were overlooked during the evacuation process. Special needs populations should be clearly defined to ensure that these populations are included and addressed in the plans. For this report, people with special needs are defined as people who are elderly, people with disabilities and other medical conditions, people with limited English proficiency, people with hearing and sight impairments, people who are in institutions, and people without access to private vehicles. Appropriate planning, coordination, and resources should be included in evacuation planning because the special needs population may need accessible transportation, medical equipment and medicine, and other accommodations that will allow for a smooth evacuation process.

### **Current Guidelines and Practices**

The NRP addresses people with special needs throughout the plan. Under ESF-6: Mass Care, Housing, and Human Services, the American Red Cross and FEMA are to assist evacuees and people with special needs. For example, the American Red Cross and FEMA are to coordinate and identify individuals with special needs within the impacted area including the elderly, people with disabilities, and people communicating in languages other than English including sign language.<sup>37</sup> Also, the NRP refers to the use of the National Disaster Medical System (NDMS), which can be activated by the DHS to assist in medical response and patient evacuations beyond the care provided under ESF-6 for Mass Care. NDMS is a partnership among the DOD, the DHS, the U.S. Department of Health and Human Services, and the Department of Veterans Affairs (VA). The DHS is responsible for the medical response, DOD is responsible for patient evacuation from the air fields to participating NDMS Federal Coordination Centers and Medical Treatment Facilities, and VA is responsible for leading the definitive care. The VA set up facilities to prepare for Hurricane Rita in September 2005. Community clinics were secured in Galveston and Texas City and the VA sent staff to weather out the storm and assist in providing care for critically ill patients in selected hospitals.<sup>38</sup>

In addition, the current American Red Cross policy is that only service animals to assist people with disabilities such as seeing eye dogs are accepted in American Red Cross shelters. Pets are not currently accepted due to hygiene and sanitation concerns. The American Red Cross is working with the Humane Society to develop facilities close to human shelters to shelter pets.

The SLG 101 provides detail on requirements to accommodate special needs populations in State and local emergency operations plans. Chapter 2 in the SLG 101 on planning, specifies that

emergency managers’ operations plans should identify the special needs groups (e.g., people with limited English proficiency, the elderly, or people with disabilities) and where they are concentrated (especially in facilities such as nursing homes).

There are both public and private requirements that hospitals and nursing homes have emergency operations plans. The recent GAO report on nursing home and hospital evacuations during Hurricane Katrina notes that, “The Centers for Medicare and Medicaid require hospitals and nursing homes that receive Medicare and Medicaid payments to maintain emergency operations plans.” In addition, the GAO report noted that “the Joint Commission on Accreditation of Healthcare Organizations requires that hospitals and nursing homes it accredits to maintain emergency operations plans that include processes for evacuations.”

State and local corrections facilities are responsible for the health and safety of their populations. Under State and local requirements, these facilities establish emergency evacuation plans and procedures. These plans usually focus on localized emergencies such as fire, rather than mass evacuations in which the entire facility must be evacuated.

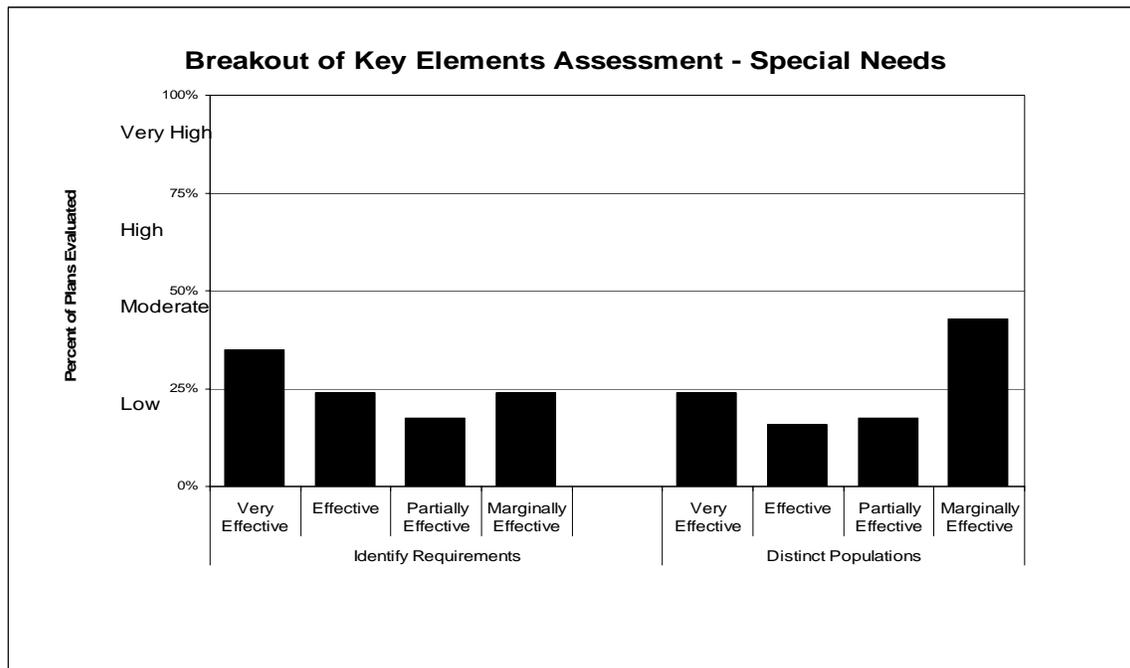
### Assessment of Current Plans

The evaluation questions developed and used for the review of the evacuation plans focused on how well these plans addressed the special needs population. These criteria are shown in Table 4-5.

**Table 4-5: Evacuation of People with Special Needs Questions and Assessment Results**

Evacuation of People with Special Needs		
Assessment	Question	
	N1	Does the plan describe provisions for evacuating special needs populations including those in assisted living facilities, hospitals, and those living independently (e.g., people with physical, mental, cognitive, and developmental disabilities)?
	N2	Does the plan describe provisions for evacuating other special needs populations (e.g., people in schools, day centers, mobile home parks, prisons and detention centers as well as, people that do not speak English or who are tourists, seasonal workers, or homeless)?

Figure 4-6 shows the assessment ratings for the special needs key element, with breakouts provided for its two questions—identify requirements and distinct populations.

**Figure 4-6: Evacuation of People with Special Needs Assessment Ratings**

The first question was used to examine whether the plans describe the means to evacuate people with disabilities. This includes plans that address people with disabilities that are in residential facilities or institutions such as nursing homes, assisted living facilities, and hospitals, as well as people with disabilities who live independently. People with special needs in an evacuation under this question include people who have physical, mental, cognitive, and developmental disabilities.

The second question was to identify whether the plans describe provisions for people with special needs other than disabilities that may need additional assistance in an evacuation. This includes people in schools, day care centers, prisons and detention centers, and drug treatment centers. It also includes people with limited English proficiency and people who are transient such as tourists, seasonal workers, and the homeless.

Overall for the first question, plans were rated as effective. Nursing homes, hospitals, and other institutions caring for disabled persons generally have evacuation plans that account for the unique needs of persons in those institutions. They have arrangements with transportation providers to evacuate residents and have plans for caring for those persons until they can be returned to the institution. Coordination of evacuation plans among the various hospitals, nursing home, and other institutions needs to be improved to assure that sufficient transportation and sheltering resources are available in the case of a mass evacuation. Coordination also needs to be improved between these plans and overall State and local evacuation plans. State and local officials should be aware of the hospital and nursing home evacuation plans to allow for coordination of supplies and other needs.

The GAO report on nursing homes also found that hospital and nursing home administrators are the key decision makers on patient evacuation. Although State and local governments can order evacuations, health care facilities are exempt and evacuate only if necessary. Issues such as the availability of a receiving facility; trained staff; and resources including food, water, electricity, and medicine; transportation; and communication systems are deciding factors for administrators on whether or not to evacuate. In addition, the nursing home must assess the risks of subjecting a medically frail person to the stress of an evacuation. During Hurricane Katrina, the destruction of communications systems left hospital and nursing home administrators unable to receive basic information, such as when assistance would arrive.<sup>39</sup>

While basic plans for evacuating sick and disabled persons in hospitals, nursing homes, and other institutions are generally effective, plans for evacuating disabled persons who are living independently are not as good. Identifying where these persons live is a challenge, and most plans are not specific on how they will meet the unique transportation and sheltering needs of these individuals.

Special needs registries were mentioned in many of the State and local plans. One county mentioned a special needs registry, but did not include relevant documents or information to support the registry. The Alachua County, Florida plan reports that 450 special needs clients have pre-registered with the Emergency Management Office in order to ensure they will be evacuated during a catastrophic emergency. However, there are thousands of other people with special needs who are not registered. Their plan also includes three facilities that are already designated to serve as special needs shelters. In a recent presentation, Louisiana officials provided a plan to provide phone line registry for people with special needs. The presentation defined people with special needs as people with medical (including physical and mental) disabilities, people with no transportation, and transients. People can call a 311 information hotline giving their contact information, number of individuals needing to evacuate, and the special needs category (if applicable). Operators create a case file for the registrant and forward it for input into the database, which is updated weekly. Afterwards, a postcard is sent to the registrant including how and where to access transportation, procedures for calling back with information updates, and a supply list on what they can bring and what is prohibited. This database informs city planners with population information for the registered people with special needs<sup>40</sup>.

For the second question on evacuating populations with other special needs, plans were rated as only partially effective. State plans reviewed have similar ways of addressing people with special needs. The plans generally address the issue of evacuating special needs groups, but most do not have detailed information on how to evacuate them, the different requirements of various special needs groups, or the additional resources that would be needed. Also, State plans have various definitions of the special needs population; some plans include one group and leave out other groups. A clear definition of the special needs population should be developed and used at the Federal, State, and local level, so that all populations will be included in evacuation plans. Mississippi and Florida have developed such systems, although they have differences in the groups they include. The needs of people with low English proficiency generally are not adequately addressed in most plans. Since Hurricanes Katrina and Rita showed that language barriers in the evacuation messages were a problem, the Gulf States are revising and/or

expanding their plans and procedures to address communicating evacuation information in multiple languages to meet the needs of a growing diverse population.

The Jefferson Davis Parish plan in Louisiana details the role of the transportation coordinator as a person who ensures incarcerated people have transportation. The plan also delineates law enforcement to assist in evacuating incarcerated inmates and dictates that the Parish agency responsible for emergency preparedness will coordinate the identification of non-English speaking persons. The plan for LaFourche Parish in Louisiana states that the school board is responsible for developing and exercising a student evacuation plan and the transportation officer is responsible for coordinating transport for school students and for children in day care centers. The school services officer evacuates and closes schools, and coordinates the use of school buses and drivers to support the overall evacuation effort.

## Lessons Learned from Recent Evacuations

**People with Low English Proficiency:** The article from the Gulfport, Mississippi, *Sun Herald Newspaper*, “Latinos Hope Next Warning Comes in Spanish,”<sup>41</sup> describes the minimal disaster response efforts to help evacuate the Spanish-speaking community. A recent report from the National Council of La Raza cited many difficulties and delays in finding Red Cross volunteers who could speak Spanish. In response, the American Red Cross launched its first Spanish-language web site, and is actively hiring Latino volunteers and board members. “The disaster response—both public and private— was a disaster for Latinos and other communities of color,” said Janet Murgulia, president of the National Council of Raza. . . .” For two days as Hurricane Katrina’s landfall loomed, Victoria Cintra, Director of the Mississippi Immigrants Rights Alliance, begged the television stations in the Gulfport area to let her broadcast evacuation messages in Spanish. The station broadcast Cintra's message only hours before landfall—perhaps too late for those within the broadcast area to evacuate to safety.

**People without Private Vehicles or Other Means of Transportation:** This group is not addressed in plans as frequently as other special needs populations. During evacuations most people without personal vehicles carpool with neighbors, family or friends or, if possible, find other means of transportation. During Hurricane Katrina, Louisiana churches implemented Operation Brother’s Keeper, a program to help evacuate those who lacked transportation. The program is a pilot initiative that encourages faith-based congregations in the New Orleans area to match “empty seats” among their parishioners who own vehicles with those who do not. The long-term goal of the program is to alleviate some of the pressures on local public transit services during an evacuation. Although only a pilot program, Operation Brother’s Keeper evacuated 60 percent of Jefferson Parish’s population that fell into this group.<sup>42</sup>

## Operations

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The operations element in evacuation is the mobilization of resources to support the evacuation and implementation of the plan once an evacuation order is given. Coordination of the activities that agencies and organizations are responsible for during the evacuation is complex. The plans to manage the evacuation once it is underway must ensure the availability of public and private

transport modes as well as the vehicles, drivers or operators, maintenance, fuel, security, and clear safe routes. The role of operations is to monitor the evacuation, manage the resources, and make adjustments in the application of those resources as the needs and conditions change.

Managing traffic along evacuation routes involves monitoring conditions in real time and having the capabilities and resources to adjust traffic operational strategies to optimize throughput of evacuees. Traffic control strategies may entail traffic signal control timings that maximize traffic flow along evacuation corridors or using traveler information systems to allow evacuees to choose the best available routes or modes.

Responsibility for operations during evacuation ranges from the local parish or county to the State and Federal levels, depending on the scale of the evacuation. Often initiated at the local parish or county level, operations can be escalated to the State and Federal levels if the magnitude of an evacuation overwhelms the local capabilities and resources available.

### **Current Guidelines and Practices**

In the NRP, the command structure, ESF-1 responsibilities, and ICS provide the operational structure for Federal participation in a mass evacuation. SLG 101 provides guidance to State and local emergency managers on operational factors in the evacuation annex and the hazard-unique annex on hurricanes. For example, SLG 101 calls for emergency managers to prepare an inventory of vehicle resources (public and private buses, public works trucks, commercial bus companies, trucking companies, truck rental companies, rail services, marine/ferry, air services, and ambulance services). It also recognizes the importance of directing and controlling traffic during emergency operations; assisting in the evacuation of people at risk in and around the emergency scene; and controlling access to the scene of the emergency or area that has been evacuated. Both the NRP and SLG 101 recommend training and exercises to test and improve plans; exercises are an important tool to find and fill gaps and shortcomings in written plans before an actual event.

### **Assessment of Current Plans**

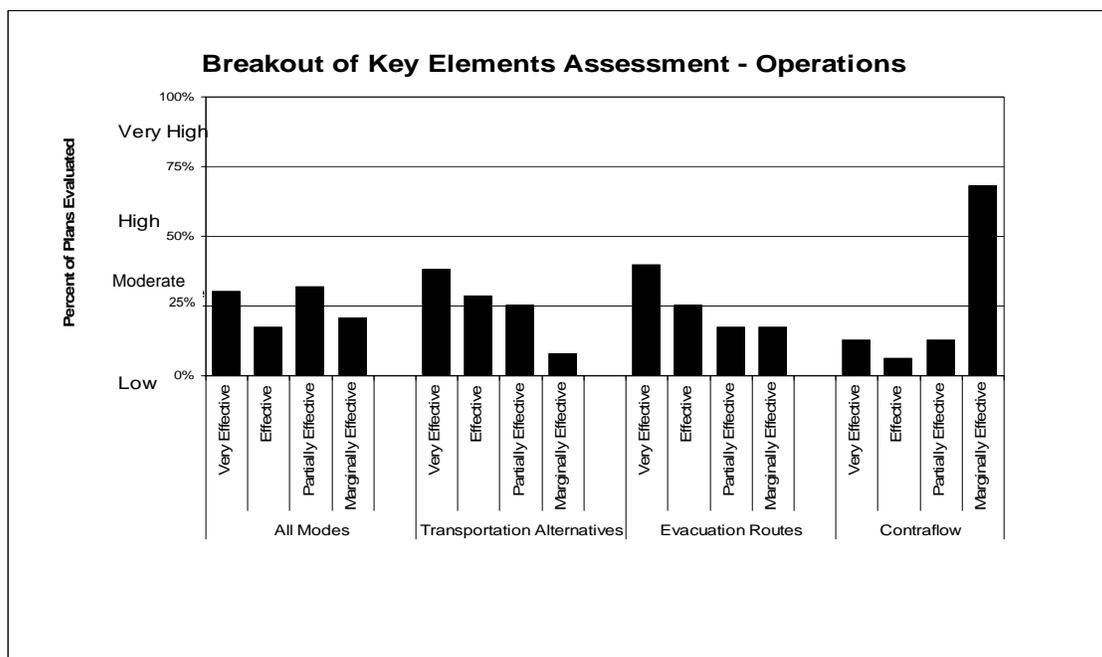
The assessment of the operational elements of evacuation plans for the Gulf Coast states is based on four questions. These criteria and rankings for the plans that were reviewed are summarized in Table 4-6.

**Table 4-6: Operations Questions and Assessment Results**

Operations		
Assessment	Question	
	O1	Does the plan include provisions to ensure availability of public and commercial transport modes and necessary transport operators?
	O2	Does the plan describe the safe and practical transportation modes that will be used to move evacuees that cannot transport themselves (other than special needs populations)?
	O3	Does the plan identify evacuation routes?
	O4	Does the plan address the use of contraflow measures?

Figure 4-7 shows the assessment ratings for the operations key element, with breakouts provided for its four questions—all modes, transportation alternatives, evacuation routes, and contraflow.

**Figure 4-7: Operations Assessment Ratings**



The first question assessed whether the plans included provisions to monitor evacuation operations of motorized transport, rail, air, water, and other modes of transportation to determine the adequacy of available resources. It also assessed whether the plans addressed contingency plans for obtaining additional evacuee transport vehicles, as needed. Another aspect assessed is how well the plans provided for coordination among jurisdictions to prevent over-tasking of transportation resources, particularly where neighboring jurisdictions also require support from the same resource provider. This question also looked at whether the plans addressed coordination with the next higher level of government (local to State, and State to Federal) to help fulfill unmet transportation resource needs to support evacuations. Lastly, this question

evaluated how effectively the plans addressed the use of standby contracts with motor coach companies, paratransit providers, ambulance companies, railroads, air carriers, etc. to obtain drivers and vehicles to fill identified transportation shortfalls.

The second question focused on assessing how well the plans addressed coordination with the agencies and organizations that are tasked to provide transportation resources. Specifically, it looked at whether the plans provisioned for the use of public transit vehicles, school buses, paratransit vehicles, non-government agency vehicles such as church buses, and volunteer group vehicles as alternative transportation options. In addition, the question examined whether the plans included provisions for identifying accommodations for the transport of luggage, etc., and how evacuees are informed about any restrictions or limitations for transportation. Lastly, this question reviewed whether the plans addressed provisions for transporting evacuees to pick-up points and staging areas.

The third question assessed whether the plans required evacuation routes to be designated, marked, and communicated to the public. It also looked at whether the plans addressed the safety of evacuation routes (roads, bridges, railways, waterways, airstrips, etc.). Another important aspect focused on whether the plans identified any provisions to monitor traffic conditions on the evacuation routes and to make operational adjustments as appropriate to maximize evacuation throughput. The assessment also checked if the plans required that critical operational changes be communicated to the Emergency Operations Center (EOC) and the public. This question also considered whether the plans identified provisions to control access to evacuation routes and manage traffic flow. In this context, the question evaluated how well the plans addressed strategies and responsibilities for maintaining evacuation route capacity, especially with regard to work zones, toll collection, and accidents/incidents. This question also checked whether the plans identified a system for notifying and coordinating with neighboring jurisdictions about what routes will be used and when. Another important aspect is whether the plans addressed strategies and responsibilities for providing food, water, restrooms, fueling stations, and rest stations along the evacuation routes. Lastly, the assessment checked whether the plans included any lists of resources that would support the evacuation routes.

The fourth and final question within this key element focused on contraflow-related aspects. Specifically, the assessment first looked for any specific contraflow plans that have been developed and coordinated with all affected parties. The evaluation examined whether the contraflow plans addressed any strategies for emergency responders, transit vehicles, and other essential equipment to move inbound against the predominant outbound flow. The review assessed how well the plans addressed communicating information to the public about the contraflow measures and the beginning and ending times for contraflow operations. The review also looked to see whether the plans identified a system for communicating and coordinating contraflow operations with neighboring jurisdictions. Lastly, the assessment checked whether the plans indicated that the contraflow plans have been tested in an exercise, drill, or a real evacuation.

With regards to ensuring availability of public and private transport modes and necessary transport operators, overall, the plans were rated as effective. Nearly two-thirds of the plans reviewed fared well with respect to addressing provisions for monitoring the various modes of

transportation to be used during an evacuation, as well as contingency arrangements necessary for obtaining transportation vehicles to help evacuate people that need transportation assistance. While most plans provide enough details about coordination with the next higher level of government, most did not cover the aspect of coordination with neighboring jurisdictions that may compete for common resources. In addition, limited information is provided in the plans addressing the use of standby contracts with private motor coach companies, paratransit providers, ambulance companies, railroads, and air carriers.

The majority of the plans effectively addressed coordination with transportation resource providers. While most plans for urban areas included transit buses, many local plans rely on school buses to provide transportation for those without personal vehicles. A few plans mentioned the use of school buses only in the context of identifying or helping the special needs population at hospitals and nursing homes. While some plans did address the use of non-government agency vehicles such as church buses, many plans did not since community and faith-based organizations may be utilizing their limited resources to transport their membership to safety during evacuations or they may not have access to those resources. Most plans did not identify any restrictions or limitations on what evacuees can bring aboard the public transportation vehicles. Nearly two-thirds of the plans addressed the designation of pick-up points or staging areas for transportation-dependent evacuees, but most did not address provisions for transporting evacuees to the designated pick-up points or staging areas.

Overall, the plans were rated effective with respect to evacuation routes. The evacuation routes are generally identified and illustrated within the plans and often posted on agencies' Web sites, and most jurisdictions provide a pamphlet or flyer for public distribution. However, the plans did not explicitly require evacuation routes to be marked. Some of the plans address the safety of routes (roads and bridges) but not other modes of transportation. Nearly two-thirds of the plans referred to the aspect of monitoring traffic conditions on the evacuation routes, but most did not include any provisions for making operational adjustments (based on monitored traffic conditions) as appropriate to maximize throughput. Nearly two-thirds of the plans require that critical operational changes be communicated to the EOC and the public. The majority of the plans addressed evacuation routes access control, but many of them did not include provisions to enhance traffic flow on designated routes. The responsibilities to ensure that evacuation routes function at maximum capacity are generally addressed in the plans, but no details on specific strategies to achieve this are included. The plans generally addressed coordination with neighboring jurisdictions with regard to the usage of routes for evacuation. However, sustained inter-jurisdictional coordination between at-risk and "host" jurisdictions along or near the evacuation corridors was not addressed in any detail. Although the plans generally identified the need to provide food, water, restroom facilities, and fuel along evacuation routes, they did not address strategies and responsibilities for providing these services. Also, plans generally did not identify other service needs that may apply specifically to special needs populations, such as meeting the needs of service animals. Finally, most plans did not address a region-wide approach to evacuation and did not identify any listing of resources to provide support to evacuees along the evacuation routes.

With respect to contraflow, Alabama uses a detailed contraflow plan with itemized checklists, alternate routes, and detailed charts laying out operational strategies. Florida's contraflow plan,

which is the responsibility of the Florida Highway Patrol, addresses seven major highways and suspends toll collections during evacuations. Unlike Alabama's contraflow plan, Florida has never implemented its plan. The other Gulf Coast States also have developed and executed contraflow plans. Most local plans did not refer to these State-level contraflow plans. Although contraflow operations are implemented and managed at the State level, it is important for local plans to incorporate information pertaining to contraflow operations in their plans, since contraflow route access begins, passes through, and terminates in local jurisdictions, affecting local transportation operations. Therefore, it is not evident from the plan reviews whether the contraflow strategies were developed and coordinated with the local jurisdictions. In addition, most contraflow plans did not address strategies for inbound emergency services traffic, communicating contraflow operations information to the public, and coordinating contraflow operations with neighboring jurisdictions, as well as their verification and validation. So even though the states had contraflow plans, this question is rated overall as marginally effective.

## Lessons Learned from Recent Evacuations

**Evacuation of People without Personal Vehicles:** Most states and local plans did well in assigning responsibilities within the agencies and organizations responsible for operations. However, alternate modes of transport in evacuation operations other than private vehicles were poorly addressed in some jurisdictions. Tens of thousands of people were stranded after Hurricane Katrina. Because some local jurisdictions had not made plans for other modes, trained their staff, designated staging areas, or prepared the public ahead of time, they were sometimes unable to effectively use the buses or trains provided through the ESF-1 program. There will be more people on the Gulf Coast who do not have transportation, which means that jurisdictions will need to use more buses, perhaps from more school systems or private providers farther away, and thus will have to put the plans in motion earlier.

The New Orleans flood plain maps are now out of date. New Orleans has 30,000 indigent workers without transportation and 60,000 people living in trailers who need to be evacuated for tropical storms.

**Effective Contracting of Transportation Resources:** Following Hurricane Katrina, Clay County, Florida, reviewed the nursing home emergency plans and discovered that they all had the same transportation vendor. Realizing the potential for a shortage, a directive was issued to require each nursing home to identify a secondary transportation provider. Pinellas County, Florida, solves the potential problem of too much demand for transportation resources by providing transit and school buses as well as ambulances to its facilities.

As part of its preparations for the 2006 hurricane season, the State of Texas has signed agreements with out-of-state bus companies to ensure that 1,100 additional buses are available to the State to supplement the resources already procured at the State and local level. State officials selected bus companies that were not already contracted to provide emergency transportation for other States in the Gulf Coast region to ensure that the buses would be available for use in Texas.

**En Route Services During Evacuation:** During the 2005 hurricane season evacuations in Florida and Texas, the need for services along evacuation routes became more evident. One of the primary resources needed by evacuees was fuel. In Florida, the Road Ranger service patrol used to assist motorists with daily incidents along major roadways was overwhelmed by evacuees seeking fuel from the limited supplies that they carry on their trucks. During Hurricane Rita, so many people evacuated in Texas that not only did they need fuel, but also water, ice, restrooms and medical services due to the long time people were in traffic during the evacuation.

As a result of these experiences, both Florida and Texas are updating their plans to provide better en route services to evacuees. Specifically, in Governor Perry's Executive Order RP57 in Texas, he directed "the Texas Department of Transportation to coordinate with the Texas Oil and Gas Association and other industry partners to develop a plan to address fuel availability along major evacuation routes and establish a fuel operations function in the State Operations Center to coordinate the distribution of fuel prior to and during evacuations" (see Appendix G for the full text).

In addition, during the meeting with State officials in Texas as part of this project, they indicated that they are also working on a plan for "aid stations" on evacuation routes to provide not only fuel but also other essential services such as water, ice, restrooms, and emergency medical services along primary evacuation routes.

**Filling Up Before the Storm Applies to Government Assets as Well:** Throughout the Gulf States, governments learned that in the presence of market disruptions to the fuel supply, the need to conserve and protect fuel assets for government vehicles and generators is important. Texas State officials met with industry representatives, and they agreed to form a fuel operations group as part of the private sector response. The private sector has taken on the responsibility to get the fuel storage tanks at gasoline stations filled up 92 hours before the storm to ensure an adequate supply.<sup>43</sup> During Katrina, one Mississippi county Emergency Manager had the foresight to coordinate with his colleagues in the school system to top off the tanks at the school bus farm, and to locate a generator at the farm for the exclusive use of emergency vehicles.<sup>44</sup>

## Best Practices

Behind every successful evacuation is a continual improvement process through which plans are modified based on lessons learned in exercises and experiences in prior evacuations. The State of Alabama's Department of Transportation (ALDOT) developed its contraflow plan for Interstate 65 (I-65) several years ago, including a step-by-step checklist that ALDOT, the Alabama Department of Public Safety (ADPS), Alabama Emergency Management Agency (AEMA), and other stakeholders utilize to implement the plan. Each year, ALDOT, ADPS, and AEMA exercise this plan prior to hurricane season to test its systems and serve as a refresher for those who have responsibilities if and when the plan is implemented. In addition, Alabama officials have worked to incorporate the lessons learned and identify additional gaps that need to be addressed from implementing the plan in advance of the landfalls of Hurricanes Ivan and Dennis.

## Sheltering

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Sheltering evacuees is a major concern of government officials and emergency responders prior to, during, and after a catastrophe. Although the majority of evacuees will stay with family, friends, or at hotels/motels rather than at public shelters, the availability of public shelters is critical to the success of an evacuation. Even those who have other places to stay often find that they must spend the night in shelters while en route to their final destinations because hotels/motels along evacuation routes are full and they must rest during their trip. Public shelters are particularly important for some special needs groups including low income households that cannot afford alternative temporary housing. Just as various special needs groups have different transportation requirements, they also have different sheltering requirements that must be anticipated and planned for in advance of an evacuation.

An important issue that came to light during evacuations associated with Hurricanes Katrina and Rita is the need for public transportation operators to know where they are going to take evacuees and for officials in these locations to be prepared to accept the evacuees. Transportation operators cannot assume that evacuees can be dropped off anywhere, especially railroads that carry many more passengers than individual buses.

This analysis assessed sheltering plans in the Gulf Coast region, as well as plans in the neighboring States of Oklahoma, Georgia, and Tennessee. In addition, Arkansas provided its response to the Nationwide Plan Review for DHS. These States are among those that can expect to receive large numbers of evacuees when a catastrophic incident requires evacuation from the Gulf Coast States.

### Current Guidelines and Practices

Numerous provisions in SLG 101 directly relate to sheltering. SLG 101 recommends mutual-aid agreements with neighboring jurisdictions for mass care staff and for facilities to shelter evacuees. This guidance also addresses the need to notify evacuees, emergency managers, and shelter operators about alternate shelter locations and to provide updates on the availability of space at each shelter. The goal is to ensure that emergency managers and evacuees know the location and availability of shelters outside the risk area. SLG 101 also addresses provisions for the care of animals and recommends specific responsibilities that evacuation coordinators, public information officers, the Animal Care and Control Agency, and mass care coordinators have for ensuring the evacuation, sheltering, care, and protection of all animals.

### Assessment of Current Plans

A comprehensive evacuation plan not only identifies locations of designated shelters, but also addresses transportation of evacuees to shelter locations, attending to the special needs of evacuees, establishment of mutual aid agreements across local governments and States to maximize shelter capacity, and care and protection of animals. In order to achieve greater community response to and compliance with evacuations, it is important that sheltering needs be adequately addressed. Four main questions were used to assess the extent to which State and local evacuation plans address essential sheltering considerations. The results of the plan

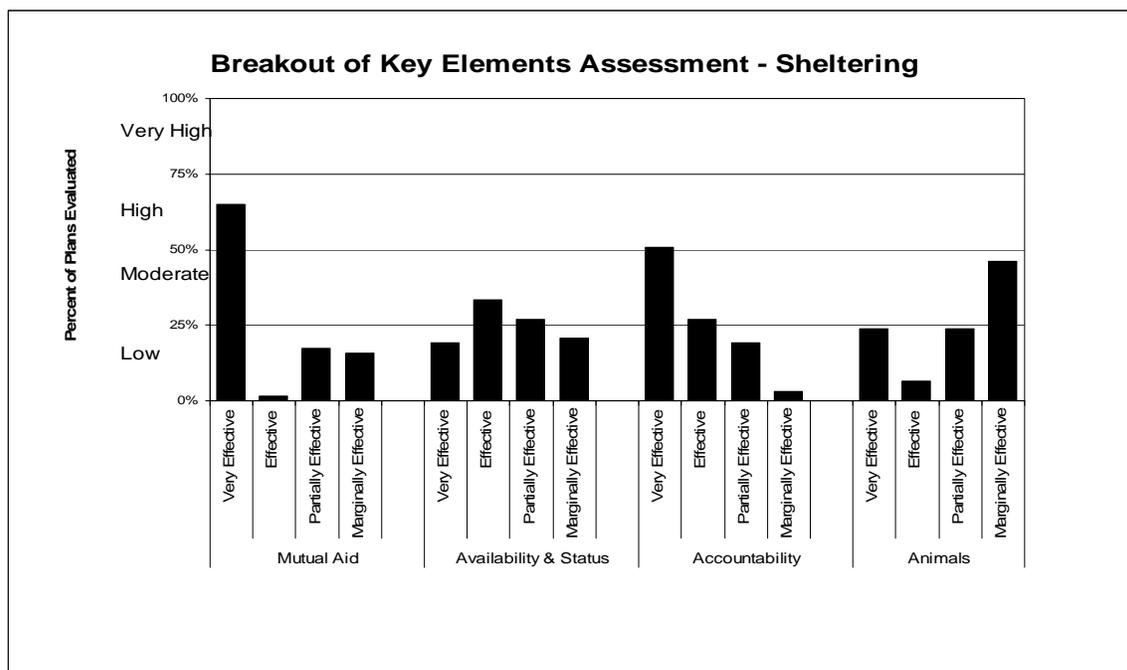
assessments are summarized in Table 4-7. Some discussion of host State shelter plans is included at the end of this section.

**Table 4-7: Sheltering Questions and Assessment Results**

Sheltering Considerations		
Assessment	Question	
	S1	Does the plan require the establishment of mutual aid agreements with other jurisdictions to formalize access to and use of shelters?
	S2	Does the plan include provisions for informing shelter operations and evacuees about the locations of public shelters outside of the evacuation area and their status (i.e., full, accepting evacuees, accepting evacuees with pets, special needs shelters, etc.)?
	S3	Does the plan address strategies and responsibilities for shelter operations?
	S4	Does the plan include provisions for the care and protection of animals?

Figure 4-8 shows the assessment ratings for the sheltering key element, with breakouts provided for its four questions—mutual aid, availability and status, accountability, and animals.

**Figure 4-8: Sheltering Assessment Ratings**



The first question assessed whether plans include mutual-aid agreements with other jurisdictions to formalize access to and use of shelters. The plans were further analyzed to determine whether they include the capacity of available space at various shelters and a process for notification and coordination with external entities for shelter activation and operations.

The second question assessed how the location and status of shelters outside the evacuation area is communicated to shelter operators and evacuees. Plans were evaluated to see whether they addressed how frequently shelter information should be updated, how information on the status of public and non-public shelters would be collected and communicated to evacuees, how shelter operators would be informed about the location and status of alternate shelter sites, and how shelter locations would be marked.

The third question judged plans on the extent to which they addressed strategies and responsibilities for shelter operations. Plans were examined to see whether they contained specific requirements that shelters provide food, water, sanitation, first aid and mental support, sufficient security, disaster welfare information, and resources for special needs populations.

The fourth question assessed whether plans contained provisions for the care and protection of animals. Such provisions include policies for sheltering pets, a communication process to inform the public of locations of shelters accepting pets, and measures to identify and evacuate other animals, including those on farms and in kennels or zoos.

Analysis of the Gulf Coast region's plans indicates that they address sheltering issues in general, but many provide little specific information on issues included in the evaluation questions. Overall, the plans were rated as effective or partially effective on each of the four questions reviewed. Some jurisdictions only identify locations of public shelters that may provide housing to evacuees, but do not address other factors such as transportation to shelters and the services at the shelters for people with special needs.

The majority of plans have established mutual-aid agreements with other jurisdictions, but it is often challenging to obtain information, including shelter locations and status updates, from other jurisdictions or agencies once an evacuation is underway. Therefore, while mutual-aid agreements have been established, the efficacy of such agreements may be tenuous during mass evacuations.

While most plans account for sufficient sheltering space to house large numbers of evacuees, they did not provide a worst-case scenario estimate of the number of evacuees who might require shelter, nor did they specify the capacities of public shelter spaces. Furthermore, the few plans that did provide shelter capacities, provided estimates that accounted for less than 10 percent of the area's vulnerable population. Clearly, it is critical for plans to be revised to reflect estimates that take worst-case evacuation scenarios into account.

The sheltering plans generally do not specifically include plans for catastrophic incidents and do not have contingency plans and strategies to adjust their plans when shelter needs change. State and local plans generally rely on local chapters of the American Red Cross, the lead organization responsible for ESF-6 functions (Mass Care), and other volunteer groups to identify and staff emergency shelters. However, some note coordination and communication problems with these volunteer groups and that shelter locations, capacity, and capabilities may be changed by a volunteer group without notifying the State's EOC. Volunteer organizations are relied upon to identify and manage shelter resources. Greater coordination and communication with the sheltering organizations must be fostered to ensure that shelters are adequately equipped to

manage all types of evacuation populations. Recently, Governor Riley requested direct reimbursement for equipping shelters that will be run by the State of Alabama to help fill the gaps that volunteer organizations, including the American Red Cross, may have.<sup>45</sup>

Most of the plans included provisions for keeping shelter operators informed on the location and status of alternate shelters. However, most plans lacked specific provisions for communicating timely status updates and locations of public shelters outside the evacuation area to evacuees. Some plans indicate that such information *will be* communicated, but do not describe *how* the information will be communicated. Where the means of communications are noted, they typically include radio, television, and/or Web sites. Television and Internet access generally would not be available to evacuees who are on the road. Contingency plans are needed to manage information sharing in a major disaster. Mississippi reported that after Hurricane Katrina, there were widespread and prolonged power outages that required emergency operations staff to pass out brochures at public gathering places on the locations and status of shelters as other traditional means to communicate were unavailable.

Few of the plans address how to acquire updates on or inform the public about the availability of space in non-public shelters, such as hotels. Additionally, few of the plans address marking shelters. While some plans require that evacuation routes be marked, shelters often are not located along those evacuation routes. Overall, plans need to include provisions for communicating shelter availability status updates and shelter locations to the public and for marking the routes and physical locations of shelters.

Sheltering provisions for special needs populations are discussed in the majority of plans. Several jurisdictions have taken the lead in including such provisions, and some are in the process of rewriting plans to broaden the definition of special needs to include other groups, such as those who are economically disadvantaged. Other plans identify the need to have large generators in special need shelters, since medical equipment and essential climate control systems require power. While many plans discuss special needs populations and are in the process of broadening the definition, provisions for sheltering of special needs populations were not discussed in any of the plans. Refuges of last resort are mentioned in nearly half the plans, but without any detail.

Plans generally do not include provisions for sheltering pets and service animals. The American Red Cross reports that it cannot accept pets in shelters because of State health and safety regulations. They do allow service animals that assist people with disabilities in American Red Cross shelters. Those plans that do mention care of pets, only provide broad guidance for accommodating them. They do not provide specific guidance for service animals that aid people who are visually and hearing impaired. In Collier County, Florida, the evacuation plan contains extensive details on caring for pets and farm and wild animals prior to, during, and after evacuations. Specifically, the plan contains an annex that addresses pets and animals by providing information to the general public about hotels that accept pets within the County as well as throughout the State, and picking up animals from emergency shelters. It also identifies multiple mutual-aid agreements for the sheltering of pets.

There were thousands of household pets that were sheltered during Hurricane Rita as part of the evacuation. The significant number of animals requiring shelter and the number of evacuees who are pet owners emphasizes the need for plans to include provisions for animals and eliminate situations where owners must choose between evacuating to safety and staying with their pets in hazardous conditions. Some jurisdictions are considering options such as opening pet shelters near or adjacent to human shelters, space for animal cages on evacuation buses when feasible, and a standardized tracking and identification system for pets.

In addition to the five Gulf Coast states, four other neighboring host states were evaluated against questions that focused on the sheltering of evacuees. Georgia, Oklahoma, and Tennessee provided complete plans, and Arkansas provided their DHS National Plan Review response.

The questions used to assess the host states' sheltering plans are derived from questions for the Gulf State evaluations. The factors of greatest concern are keeping shelter information current during the evacuation, and coordination and communication with the impacted States on the timing and status of the evacuation including how long evacuees will require shelter and transportation of evacuees from train, bus, and airports to host shelters.

Several supporting host State attributes are needed for the implementation of a host sheltering plan. Those host State attributes require a plan to provide resource listing and capabilities to support shelter operations (e.g., food, water, sanitation, housing, security, welfare information, first aid and mental health) and trained personnel to support shelter management operations, and the plan must address special needs populations.

In addition, the host State factor attributes require a plan to provide an estimate of the number of evacuees that can be sheltered, the availability of non-public shelter such as hotels, a policy with respect to bringing service animals and pets to shelters and routes to the shelters, and that the shelters are marked.

Generally, the plans do not anticipate supporting evacuations as a host. In fact, one of the plans has several statements such as evacuations "within the boundaries of the State." Furthermore, the plans do not address coordination and communication with the impacted States. The plans do, however, provide for a national response at the direction of the President of the United States, that could include the implementation of sheltering plans and initiatives to support an impacted State. Many of the Gulf Coast State plans evaluated, identified their States as possible hosts for sheltering other communities, counties, and States.

The host State plans did address special needs populations and strategies and responsibilities for shelter operations, including food, water, sanitation, housing, security, welfare information, first aid, and mental health care at their respective shelters.

## **Lessons Learned from Recent Evacuations**

**Provisions for Pets:** During Hurricane Katrina, many residents did not evacuate because people wanted to take care of their pets and refused to evacuate without them. Plans for evacuating and sheltering people were labeled inadequate because provisions for pets were largely not taken into

consideration. However, extra provisions were taken during Hurricane Rita, where pets were allowed to evacuate with their owners and provided with special guidance. Shelter operators in other States are reexamining their policies with respect to accommodating pets.

**Sister Cities.** Cities throughout Texas are piloting a Sister Cities Program that would designate Austin as Galveston's host, San Antonio's as Corpus Christi's, etc. While these destinations would not be mandatory, it will help strengthen the planning and operations of shelters in these host communities.<sup>46</sup>

**Planning Beyond 72 Hours.** During most evacuations, shelters are designed to be open 72 hours. In the case of a catastrophe like Katrina, people may need to stay longer because they cannot go home. This poses a challenge for already stretched resources—staff, many of whom are volunteers, need to be relieved, supplies replenished, and services expanded so that evacuees can begin to deal with longer dislocations.<sup>47</sup>

**Volunteers:** Tens of thousands of volunteers from the American Red Cross, Salvation Army, and many religious organizations mobilized volunteers to provide critical sheltering services in the Gulf Coast region and to evacuees across the country. For example, Citizen Corps coordinated volunteer efforts throughout the country, with more than 14,000 Citizen Corps volunteers from all 50 States and the District of Columbia actively involved in response and recovery efforts across America. The Harris County, Texas, Citizen Corps Council brought together an enormous number of volunteers to support the American Red Cross, and staffed evacuation centers throughout Houston. The Council processed over 8,000 volunteers in one day, and an average of 3,500 per day overall. These volunteers allowed for the creation of an actual city (with its own zip code) for nearly 25,000 Louisiana evacuees sheltering in the Houston Reliant Astrodome. They were successful because they had coordinated ahead of time with local businesses and volunteer groups, and because they were familiar with and implemented elements of the ICS.<sup>48</sup> Additionally, more than 300 Arkansas Citizen Corps volunteers assisted over 9,000 evacuees being housed at Fort Chaffee, the National Guard/U.S. Army Reserves Training Center in Sebastian County, in providing care at a medical center where 2,200 evacuees received medical attention in the first 48 hours and managing dining facilities and an off-site donations collection center.<sup>49</sup>

## Best Practices

A key component of Florida's State Emergency Response Team (SERT) is its use of GIS technology. One way that SERT uses GIS is to collect and provide information about open and closed shelters throughout the State to responders, government officials, and the public.

The Florida State Emergency Operations Center (SEOC) Mapper Program allows the SERT staff to use the GIS to remain current on events as they unfold and obtain information about locations of shelters, logistics areas, and command posts. This program is unique in that it provides for one-site storage and dissemination of emergency management and law-enforcement data to the State and county EOCs, responders in the field who can share this information with the public via variable message boards and other communications channels, as well as to the public website. This allows staff at all levels to make decisions based on the same set of data and the

public to be kept well-informed of the evacuation process, including danger areas and evacuation zones and routes.

At the present time, one can access the SEOC Mapper database via [http://www.eoconline.org/EM\\_Live/shelter.nsf](http://www.eoconline.org/EM_Live/shelter.nsf) to view a list of open and closed shelters, the availability of space at special needs shelters, and other relevant details. The longitude and latitude coordinates of shelters are pre-populated to allow for quicker updating. County officials may choose to input updated data about shelter availability via the Web or by calling the SEOC where the GIS team can enter information directly into the database. This information is updated frequently during a disaster, assisting emergency managers, first responders, and the public in receiving the important information they need about the availability of shelters. The SERT GIS team is working now to implement improvements to the SEOC Mapper database to make the program more user-friendly for emergency managers, first responders, and the public.

## Mass Evacuation Training and Exercises

A well-developed training and exercise program is a critical element of overall readiness and preparedness for mass evacuations. Training ensures personnel are prepared for their roles. Exercises test the capabilities and resources of the agencies, and when a number of cooperating agencies and jurisdictions are included, they also test and strengthen working relationships. Training and exercises to test and improve plans for an evacuation from a catastrophic incident are especially important because of the large number of agencies and jurisdictions involved in such an evacuation.

Emergency management agencies need trained people, who have experience working together with colleagues and counterparts in other levels of government prior to a disaster, as a part of emergency response teams. Emergency responders should not meet each other for the first time immediately before, during, or after a major catastrophe. The coordination of the multiple agencies involved is not simple, and the integration of multiple jurisdictions, agencies, States and NGOs is very difficult to practice. Tabletop exercises, seminars and other exercises can be done to help agencies delineate and coordinate responsibilities, and a coordinated exercise program can help prepare planners, responders, and agencies at all levels of government to respond to a disaster of the

### Figure 4-8: Training Definitions

**Training:** A process to learn a new skill or job. Training can be accomplished through classroom instruction, coursework, independent study, on-the-job training, and exercises.

**Exercise:** Practice situations to improve skills and procedures.

**Table-Top Exercise:** An exercise conducted in a seminar format that allows senior leaders and staff to examine and discuss issues in a controlled environment.

**Full-Scale Exercise:** An exercise that fully implements a plan or process.

**Computer-Assisted Exercise:** Exercises designed to incorporate simulations and to train leaders without the manpower requirements of a full-scale exercise.

**Hot Wash:** A facilitated discussion immediately after a training event or exercise in which training audience members discuss issues and lessons learned and begin the process of incorporating change.

**After-Action Report:** An assessment and report on the results of an exercise. It should include a list of findings, lessons learned, and recommendations to strengthen and improve procedures and processes.

magnitude of Hurricane Katrina. This creates a need to rely on well-trained, capable people that adapt and adjust to the situation in order to get the job done. An effective, integrated exercise and training program enables better preparation and response to large-scale disasters.

NIMS defines the *preparedness cycle* as “planning, training, equipping, exercising, evaluating, and taking action to correct and mitigate.” Exercises play an important role in this broad preparedness cycle. Exercises provide opportunities for Federal, State, and local leaders; homeland security officials; and emergency responders to practice and test capabilities that have been built up through an overlapping structure of planning, training, and equipment purchases. Exercises inform preparedness priorities by highlighting potential preparedness shortfalls prior to real incidents. These priorities then become the basis for future funding, training, and equipment purchases, which become the basis for future exercises.

*“Coordinating all of those agencies isn’t a simple thing and [is] very difficult to practice. We sit down and do tabletop exercises where we go over who’s going to do what, but a disaster of this magnitude is something that is very difficult to simulate or really practice. So, we rely on really well-trained, capable people that can adapt and adjust to whatever the situation is to get the job done.”*

Colonel Richard Bachmann,  
U.S. Air Force  
During evacuation operations supporting  
Hurricane Katrina

## **Current Guidelines and Practices**

The NRP recognizes the critical importance of training and requires training throughout the plan. The NRP calls for training and exercises for individual managers and staff, as well as for government agencies, the private sector, and the NGOs involved in emergency response. Training is also a function of the ongoing management and maintenance of emergency management plans. The NRP requires training for key positions. The Federal government participates with State and local jurisdictions in exercises that include mass evacuation response.

SLG 101 addresses training in detail and recommends training and exercises that model the planning and operations of an emergency management plan to prepare management and staff to meet their responsibilities. Training helps emergency response personnel to learn their responsibilities and to acquire the skills necessary to perform assigned tasks. Exercising provides a means to validate plans, checklists, and response procedures and to evaluate the skills of response personnel.

A broad range of training and exercise programs are available nationwide from government agencies, associations, and private trainers, and includes much more than just classroom training. Figure 4-8 defines some of the types of training and terms used by the emergency management community. Training and exercises that specifically address catastrophic or mass evacuations are limited. Few of these courses include mass evacuation as an element except for courses directed toward response to incidents near nuclear reactor sites. Many jurisdictions conduct disaster response exercises without including key transportation agencies such as State and local highway departments and/or police departments that would be managing the flow of traffic or setting up contraflow operations. Transit agencies and school bus operators are not often included in the exercises, even though some of the plans of local jurisdictions include these vehicles as resources for an evacuation.

## Assessment of Current Plans

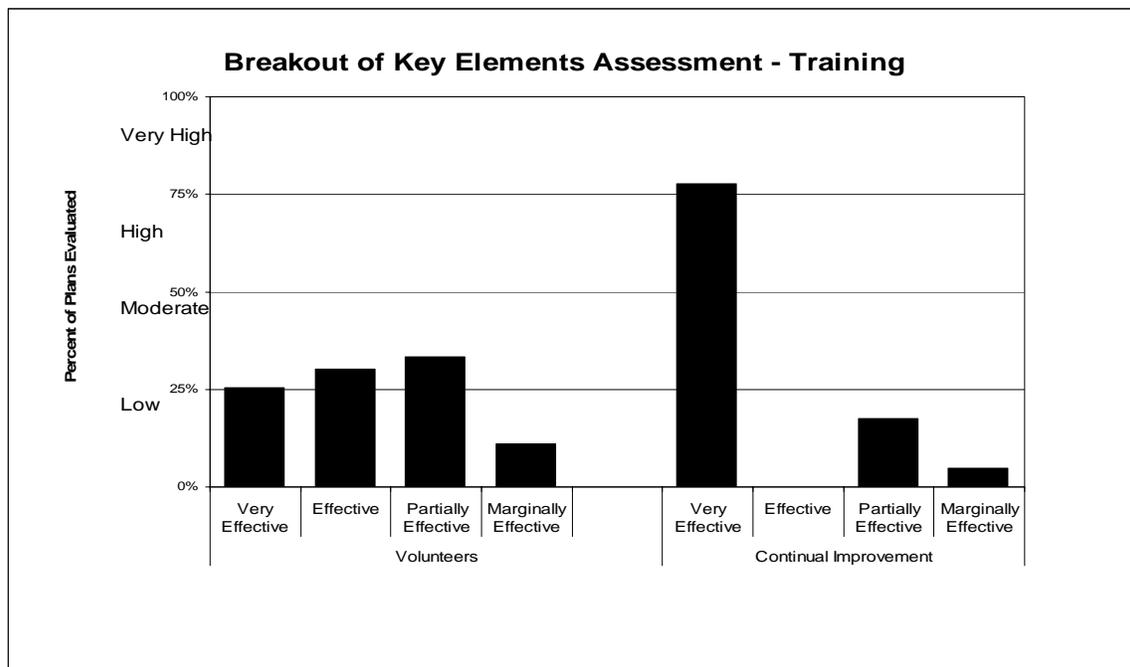
In examining State and local plans for training and exercises, plan reviewers looked for evidence of a training and exercise program, and how that was integrated in that jurisdiction. Additionally, reviewers looked for how the plans were updated and improved based upon lessons learned through exercises or after-action reports from actual events. The questions used for the assessment and overall ranking of the State and local plans in the gulf coast region reviewed for this study are listed in Table 4-8.

**Table 4-8: Training and Exercises Questions and Assessment Ratings**

Mass Evacuation Training and Exercises		
Assessment	Question	
	T1	Does the plan include provisions for training a volunteer cadre to support shelter management operations, transport of evacuees, and first aid stations along the evacuation routes, etc.?
	T2	Does the plan require periodic reviews and updates of the plan, exercises, and after action reports as part of the planning process?

Figure 4-9 shows the assessment ratings for the training key element, with breakouts provided for its two questions—volunteers and continual improvement.

**Figure 4-9: Training and Exercises Assessment Ratings**



In a catastrophic incident, emergency response agencies rely on assistance from a range of volunteer groups such as the American Red Cross, public service organizations, and church

groups. Volunteer groups provide essential “surge capacity” for emergency response agencies in a catastrophic incident. The assessment also examined whether the plans included provisions for training a volunteer cadre to support shelter management operations, transport of evacuees, and first aid stations along the evacuation routes, and other functions.

State and local jurisdictions in the Gulf Coast region that were reviewed for this study had training and exercise programs for their first responders including police, fire, and emergency medical services, and they were rated as very effective. Most of this training is focused on meeting day-to-day missions for emergency and disaster response in their communities. Very few jurisdictions had training that focused on mass evacuation or on issues that cross jurisdictional boundaries.

All of the States examined for this report indicate a commitment to an exercise, drill, and training program. Alabama conducts or participates in approximately 50 training exercises each year ranging from “table-top,” classroom-like discussions to full-scale exercises involving all members of the emergency management community, including Federal, State, and local officials.<sup>50</sup> It is not feasible to test mass evacuation plans through full-scale drills because they would be too disruptive to the public. Several of the States, however, regularly include table-top exercises to test their procedures and processes and include representatives from transportation agencies. Orange County, Florida, has a detailed exercise program, with a system for incorporating lessons learned as needed, which is discussed later in this section.

In addition, there is a critical need to conduct a series of integrated exercises involving Federal, State, and local agencies; NGOs; and other related organizations in the Gulf Coast region to improve the response to the 2005 hurricane season, identify and implement improvements to existing evacuation plans and procedures, and test the improvements prior to the 2006 hurricane season. It is essential that Federal response agencies and the Gulf Coast State and local jurisdictions coordinate their efforts and institute a series of planning events and exercises to identify immediate coordination and preparedness improvements that will have an immediate impact on preparedness. In the spring of 2006, DHS sponsored a Gulf Coast Hurricane Preparedness Exercise series in coordination with the States of Texas, Louisiana, Mississippi, Alabama, and Florida, in an effort to validate the revised coordination and response plans and improve preparedness, should another catastrophic storm strike during the 2006 hurricane season.

Integrated training opportunities that cross jurisdictional borders (e.g., county, parish, or State) were not referenced in discussion, other than attendance at regional seminars or training conducted by the Federal government. Florida conducts an annual statewide exercise prior to each hurricane season and involves all appropriate State agencies and multiple county and municipal agencies in the area impacted by the training scenario. Integrated training at the State level was not discussed in any detail. This includes Gulf Coast State participation in regional conferences to review hurricane response. All of the Gulf Coast States participated in a recent February 2006 conference in Orlando, Florida, on contraflow operations sponsored by the Florida Department of Transportation. At this conference, that was supported in part by the FHWA, States shared strategies, techniques, and lessons learned.

The questions of having plan updates based on lessons learned were addressed in the written plans, but many of these plans had not been updated in the recent past. Methodologies for incorporating changes to plans based on lessons learned were not observed.

## **Lessons Learned from Recent Evacuations**

**Training:** Training of key personnel in emergency management agencies is well accepted as an integral part of ensuring readiness for catastrophic incidents. However, the skills and capabilities of personnel assigned to “surge teams” that deploy to assist with on-site support must also be maintained and updated through training and exercises. The after-action report for the ESF-1 program for the 2005 hurricane season found the volunteers from throughout the agency to be important resources to help meet the demands of a catastrophic incident, but that some needed more training in the established ESF-1 and NRP processes.

An integrated training program is needed, in part because of the steep learning curve for complex operations that cross jurisdictional boundaries and involve a regional response that is facilitated by Federal assistance. Additionally, the learning curve required for understanding Federal programs and assistance can be steep, and this knowledge needs to be sustained and maintained.

**Incorporating Lessons Learned:** After-action reports from agencies involved in mass evacuations, including Federal agencies such as the National Hurricane Center, provide a valuable source of information to improve mass evacuation processes. The DOD’s U.S. Northern Command and its components have participated in a number of full-scale exercises where the exercise scenarios were designed to overwhelm local and State assets to evoke a response under the NRP, including the employment of DOD assets. In addition, DOD is preparing a review of its military assistance to civil authorities in response to Hurricane Katrina, which will be another important source of information. The lessons learned from the responses to recent hurricanes (e.g., Katrina, Rita, Charley, Ivan, and Opal) as well as earlier hurricanes (e.g., Camille, Hugo, and Andrew) continue to be valuable. Lessons learned from major exercises such as Hurricane Pam in New Orleans identified evacuation issues for the city. Federal, State, and local agencies should establish processes to ensure findings and lessons learned from after-action reports are addressed and incorporated into procedures and training.

**Senior-Level Participation in Training and Exercises:** Government training exercises should be sufficiently challenging. In some cases after Hurricane Katrina, it was felt that top officials (from Cabinet-level secretaries and generals to governors and mayors), did not participate in exercises and that these training events did not last long enough.<sup>51</sup> The GAO, in a February 1, 2006 statement, also noted key players are not always involved in drills, the lessons from previous training and exercises are not retained, and the training and exercises are more targeted at terrorist events than natural disasters.<sup>52</sup> Based on exercises and drills, it is possible to learn and exercise a unified command through the ICS. This would allow exercise of these systems, which can greatly assist with major command and control issues, as were seen during Hurricane Katrina. This would allow for more effective and immediate direct support for incident response. The use of simulations or computer-assisted exercises allows for a more robust exercise to assess processes, procedures, and plan implementation and allow key leaders the opportunity to examine issues in a simulated environment.

**Logistics Training and Exercises:** Logistics will be critical to the success of sheltering for mass evacuations. In Hurricanes Katrina and Rita, private companies such as Wal-Mart and Home Depot were able to deliver large amounts of disaster relief supplies before the Federal government. There is a need to examine the provision of common supplies and services such as fuel, water, food, and transportation and learn from private sector companies that are experts in logistics. This includes the movement of material into and out of the evacuated area and into specific processes that would manage the supply or service cycle. Even in full-scale exercises, logistics is rarely fully addressed. Exercises are an important tool to test current logistics processes and expose potential weaknesses of logistics plans to support mass evacuations.

## **Best Practices**

**Training and Exercises:** Orange County, Florida, has established an annual exercise program to determine the ability of local governments to respond to emergencies.<sup>53</sup> This training and exercise program, coordinated by the Orange County Office of Emergency Management, is the overall coordinator within Orange County for emergency management training and exercises. County departments and authorities, municipalities, and all other public and private emergency response agencies also bear the responsibility of ensuring that personnel with emergency responsibilities are sufficiently trained. The Orange County CEMP also requires that all agencies take necessary steps to ensure appropriate records are kept reflecting emergency training received by their personnel.

## **Chapter 5: Findings and Recommendations**

In response to the Congressional request for a study of evacuation plans for the Gulf Coast region, the U.S. DOT conducted an assessment of 63 State, county, and parish evacuation plans and met with officials from each of the Gulf Coast States to discuss evacuation planning issues. The study was done in coordination with a broader nationwide study underway by DHS to review the emergency management plans for the States and the 75 major urban areas. Because of their vulnerabilities to hurricanes, jurisdictions in the Gulf Coast region have more experience with evacuations than other areas of the country, and in many respects their plans provide a benchmark for other States. However, there are areas in which the effectiveness of State and local plans in the Gulf Coast region could be improved to better address the requirements for mass evacuations. The U.S. DOT will use the information from this study as it moves forward in partnership with DHS and other Federal agencies and with State and local agencies to meet the challenges of evacuations from catastrophic incidents.

The intent of the study was not to rate individual plans or to recommend changes in individual plans. Rather, the objective was to assess the general strengths and weaknesses of plans across the region to serve as a basis for identifying the most significant needs for assistance in evacuation planning and how that assistance can most effectively be provided. Chapter IV details findings of the plan evaluations. This chapter summarizes those findings, discusses initiatives underway to address some of the weaknesses uncovered in the assessment, and recommends further actions to improve overall mass evacuation plans and capabilities.

Overall, there are three crosscutting issues and study findings that emerged from the study:

- Current evacuation guidance, plans and exercises do not adequately reflect requirements for Federal, State, and local coordination to effectively execute a mass evacuation from a catastrophic incident.
- Evacuation plans and operations focus primarily on evacuations by private vehicles and do not adequately address the use of other safe and practical modes that could be used to evacuate persons, especially those with special needs.
- Plans generally include provisions for communicating information on evacuation routes, what evacuees using personal vehicles should take with them, and where shelters are located; however, plans for communicating essential information to those who do not have access to an automobile and to those with other special needs generally are not as well developed.

### **Specific Findings and Recommendations for Key Elements of Evacuation Planning and Operations**

This section summarizes major findings from the study for each of the key elements in evacuation planning and operations. Recommendations and current actions related to these findings are also discussed.

## Decision Making and Management

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### Findings

Federal, State, and local emergency plans and operations for evacuations are not well integrated.

- **Coordination:** Decision making and coordination processes, including real-time operational command and control, are in place but are not sufficient to meet the demands of a mass evacuation from a catastrophic incident. The NRP and SLG 101 establish a framework for Federal, State, and local jurisdictions to work together to execute most evacuations, but neither contains adequate guidance for a catastrophe the magnitude of Hurricane Katrina. The processes for joining resources and linking decision making are not developed well enough. The lack of regional exercises to test decision making and management processes for a wide-scale mass evacuation also contribute to weaknesses in management.
- **Mutual Aid:** All of the Gulf Coast States have mutual-aid agreements with neighboring States and are members of the Emergency Management Assistance Compact (EMAC). All of the local jurisdictions also have mutual-aid agreements. Local agreements were not efficient for a hurricane the size of Katrina because the neighboring jurisdictions were also inundated and unable to provide timely assistance. State officials believe the EMAC process and agreements need to be updated to address problems associated with mass evacuations. Strengthening mutual-aid among jurisdictions is a critical step to improve mass evacuations.
- **ESF-1 Roles:** Evacuation roles and responsibilities under the ESF-1 program are not well understood by all State and local jurisdictions. Many agencies are unaware of the resources and capabilities the U.S. DOT has available to help in an evacuation. There also is a gap between ESF-1 functions provided in accordance with the NRP and the evacuation capabilities of some State and local agencies, especially in the area of operational command and control.

### Recommendations and Current Actions

- DOT is working to clarify the Federal, State, local, and tribal government, non-governmental organization, and private sector roles, responsibilities, and expectations for evacuation activities under ESF-1.
- The NRP, SLG 101, and other evacuation-related guidance should be updated to reflect lessons learned in implementing evacuation plans during recent mass evacuations.
- Federal agencies should work with the National Emergency Management Association (NEMA), States, and local jurisdictions to improve EMAC to develop more effective and better coordinated mutual-aid agreements among State and local jurisdictions.
- Regional exercises such as those that DHS is conducting in preparation for the 2006 hurricane season should be held on a regular basis to provide a mechanism for officials from different agencies and different levels of government to jointly review management requirements and resources available for mass evacuations.

## Planning

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### Findings

- **Insufficient Guidelines:** The States and local jurisdictions generally meet the guidelines for evacuations outlined in SLG 101 and have demonstrated their ability to plan and execute many evacuations from hurricanes. However, those guidelines did not lead to evacuation plans, organizational and management processes, or coordination with other levels of government that are necessary for a mass evacuation from a catastrophic incident. Further, SLG 101 has not been updated to correspond with the NRP.
- **Lack of Detail in Plans:** While some jurisdictions have well coordinated and tested plans, some have plans that do not include sufficient detail to ensure their effective execution. These jurisdictions may be the “weak link in the chain” when jurisdictions across a region must mobilize in a coordinated manner to respond to a catastrophic incident. Some locations such as coastal Texas and southeast Florida have developed regional evacuation and traffic management plans encompassing many jurisdictions for a large-scale evacuation.
- **Complex Evacuation Plans:** Evacuation plans for a region are spread among a “family of plans.” These include plans, supplements, and annexes from various agencies and jurisdictions. They are organized differently and have varied levels of specificity. It is difficult for planners to assemble all of the important evacuation elements from the various agencies. In addition, it is difficult for planners and operational staff to assess whether all of the pieces work together and in coordination with the plans of other jurisdictions. These problems are compounded when a disaster includes multiple States and the Federal government.
- **Transportation Expertise:** Transportation agencies and providers have a unique understanding of evacuation, but emergency management and/or public safety agencies may do the planning and lead the decision making without sufficient input from transportation planners and operators including the various modes to be involved.
- **En Route Services:** Plans do not usually address the need for services en route for evacuees including fuel, water, food, restrooms, shelter, and medical needs.
- **Operational Plans Integration:** Evacuation plans at all levels of government inadequately support effective real-time command and control of mass evacuations, especially evacuations involving multiple States and the use of transportation modes other than personal vehicles. Plans need to better complement each other and provide for a smooth integration of Federal resources, capabilities, and operational structures.

*"The United States was, and is, ill-prepared to respond to a catastrophic event of the magnitude of Hurricane Katrina. Catastrophic events are, by their nature, difficult to imagine and to adequately plan for, and the existing plans and training proved inadequate in Katrina."*

U.S. Senate Committee on Homeland Security and Governmental Affairs, April 2006.

## Recommendations and Current Actions

- The U.S. DOT will continue to participate in the DHS processes to review and improve the NRP and SLG 101 guidance and incorporate the lessons learned from the 2005 hurricane season.
- Regional plans for mass evacuations in connection with one or more catastrophic incidents on the scale of Hurricane Katrina should be developed. The plans should be developed jointly by State and local officials within the region in cooperation with officials from appropriate Federal agencies; providers of all safe and practical modes of transportation; providers of shelters, food, fuel, and other necessities; managers of hospitals, nursing homes, jails, and other institutions with their own evacuation plans; and representatives of various special needs populations.
- Hurricane Evacuation Studies should be frequently updated. Procedures should be developed to allow critical information in these studies to be updated regularly without the need for a major study effort.
- Evacuation modeling tools should be developed that can predict evacuation times, manage evacuations in real time, and also be used by large and small jurisdictions to better support evacuation decision making, planning, and operations.
- Transportation agencies and operators should be more directly involved in key aspects of evacuation planning and implementation.

## Public Communication and Preparedness

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### Findings

- **Public Education and Responsibility:** Many State and local plans do not contain adequate provisions for informing residents and visitors about who has to evacuate, when, and why. Insufficient information is often given for people to understand the differences between hurricane watches and warnings, voluntary and mandatory evacuations, and other facts that people need to make better decisions on whether and when to evacuate.
- **Tailored Communications:** Some State and local plans provide for communicating basic evacuation-related information to residents in Spanish or other foreign languages, but most plans do not. Plans need to be improved for communicating evacuation-related information to people with limited English proficiency, people who are difficult to reach such as migrant workers and the homeless, and people with visual or hearing impairments.
- **Communicating with Evacuees During an Evacuation:** Plans for communicating information during an evacuation are not as well developed as plans for communicating prior to an evacuation. During an evacuation, evacuees typically will not have access to the Internet or to television—two of the primary means of providing pre-evacuation information. Many States position dynamic message signs along evacuation routes and staff at rest areas, truck weigh stations, welcome centers, and service plazas to provide information to evacuees en route. Motorist information services such as the 511 telephone system Florida has deployed or highway advisory radio can provide route-specific information. To get real-time

traffic information on evacuation routes, traffic monitoring equipment is required. That equipment is not widely deployed in most rural areas, but Florida has an extensive traffic monitoring system. Portable ITS components and systems can allow States to dramatically increase these capabilities in rural areas

## Recommendations and Current Actions

- Systems to provide information to evacuees and emergency managers during the course of evacuations on the status of traffic, shelters, fuel, and other services along evacuation routes should be improved and deployed. Systems should be based on existing ITS architecture and, to the maximum extent possible, should be incorporated into general purpose motorist information and traffic monitoring services used during normal traffic operations.

## Evacuation of People with Special Needs

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### Findings

More planning must be conducted to accommodate special needs populations in an evacuation.

- **Defining Special Needs:** Current evacuation plans often define “special needs” populations too narrowly to address all those who need transportation during an evacuation. Considerations for people with special needs are included in plans when the groups are identified; however, many plans do not include certain special needs populations. For example, some plans include only people in institutions as having special needs, and do not include people with special needs who live independently, even though they still need assistance to evacuate.
- **Residential Institutions:** Major institutions, such as prisons and hospitals, are responsible for evacuating their facilities, but the evacuation plans are often not coordinated with the emergency management agency, and they do not know whether the plans function together (e.g., How much notice does the institution need? Are they relying on other State or local resources such as State Police or vehicles who might be assigned elsewhere in a catastrophe?).

### Recommendations and Current Actions

- The U.S. DOT is preparing a primer on evacuating various special needs populations. This primer will include essential information and technical assistance for State and local agencies and others responsible for evacuating and sheltering persons with various special needs.
- State and local agencies should work with the special needs communities to develop systems whereby those requiring specialized transportation or sheltering services during evacuations can make those needs known to emergency managers and operators of transportation and sheltering services before evacuations

## Evacuation Operations for All Modes of Transportation

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### Findings

ITS proved very useful in an evacuation.

- **Advanced technologies:** Over the last 10 years, many State and local agencies have installed ITS systems in their urban and high-traffic areas to better manage traffic flow and assist with incident management on a daily basis. These systems proved very useful in an evacuation, but are generally not available in rural and less populated areas. However, mobile or portable transportation management components will increase an Agency's capabilities to monitor and respond to conditions along various evacuation routes.

Catastrophic evacuations can quickly overwhelm State and local transportation resources.

- **Contraflow Operations:** States in the Gulf Coast region all have contraflow plans, and those plans have been used in recent evacuations. Contraflow operations can be very effective, but substantial planning is required to assess details of how, where, and under what conditions it will be implemented. Few of the plans included detailed plans to use alternative modes of transportation for evacuating people without access to private vehicles.
- **All Safe and Practical Modes of Transportation:** Most State and local evacuation plans focus primarily on highway evacuations by personal vehicles, which is by far the predominant mode. Plans, in general, do not give adequate attention to evacuation by other modes including buses, trains, ships, and planes. Several States recently have entered into agreements with motor coach operators to secure services of additional motor coaches, should they be needed. Buses, trains, ships, and airplanes are relied upon by those with special needs and those without access to an automobile.

### Recommendations and Current Actions

- The U.S. DOT is working to establish procedures for advance notice from State and local agencies that evacuation assistance may be needed in the future. These coordination processes will identify the type and number of resources the U.S. DOT can supply and the time needed for deployment. The U.S. DOT will continue to work with the State and local agencies to better understand each other's capabilities and to ensure there is an adequate understanding of the process to request such resources.
- ITS systems should be deployed more widely on evacuation routes to monitor traffic conditions and to provide information to evacuees on alternative routes. This is an efficient means of communicating with evacuees not only during an evacuation but also during the re-entry after the storm.
- The U.S. DOT and several States have begun to reach out to various segments of the transportation industry to better understand their requirements to effectively participate in a mass evacuation associated with a catastrophic incident.

## Evacuation-Related Sheltering Considerations

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### Findings

- **Evacuation route services:** Few plans addressed services along the evacuation route such as fuel, food, restrooms, and water, or access to emergency medical services. Few plans provided for these services or addressed how to communicate the information to evacuees. Such an effort will have to involve the private sector such as gasoline suppliers and retailers, hotels, and restaurants and other food service providers. These groups are not often included in emergency planning activities.
- **Shelter destinations:** Current plans do not adequately address the number of shelters that might be needed for a mass evacuation comparable in scope to Hurricane Katrina. Because of the large number of evacuees, there were not enough shelters to accommodate the number of people seeking them. The U.S. DOT arranged for motor coaches to transport evacuees, but had difficulty finding shelter destinations for those evacuees. Some pre-existing agreements on who could use the shelters were not honored due to the massive number of people who evacuated in Texas during Hurricane Rita and evacuees still in Texas shelters after Hurricane Katrina. MARAD ships proved their value in providing shelter (and command and control capabilities) for emergency response workers, displaced critical workers and emergency response equipment.
- **Pets:** Current plans do not adequately consider accommodation of pets. The lack of shelter and accommodation of pets on various modes of public transportation was a significant issue during the recent evacuations. Thousands of pets needed care and shelter, and many people refused to evacuate without their pets.
- **Transporting Rescued Persons:** Hurricane Katrina illustrated failure to integrate search and rescue missions and the subsequent need to transport those rescued persons to shelters or assembly areas for evacuation.

### Recommendations and Current Actions

- The U.S. DOT has established liaisons with the American Red Cross and the Humane Society of the United States to work on major evacuation issues. The U.S. DOT will continue to work with the American Red Cross and other organizations involved in sheltering to more effectively meet needs associated with mass evacuations.
- State and local regulations with respect to accommodating pets on public transportation and at public shelters should be reviewed and modified as appropriate to provide greater accommodation of pets during evacuations. These changes should be communicated with the public and shelter operators.
- Steps should be taken to ensure that all forms of temporary housing meet Americans with Disabilities Act Accessibility Guidelines. Steps should be taken to consider the needs of those with disabilities who may need special accommodations.
- DOT should assist DHS develop a comprehensive search and rescue plan that integrates rescue missions with transportation and evacuation.

## Training and Exercises

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### Findings

Training and exercises are critical to practice established procedures, processes, and agency relationships.

- **Regional and Interagency Training:** All of the States examined for this report indicate a commitment to an exercise, drill, and training program. Several of the States regularly include table-top exercises to test their procedures and processes, include representatives from transportation agencies, and have a system for incorporating lessons learned as needed. Agencies reported that the relationships and experience built through training and exercises assists with successful evacuations. However, the States generally train and exercise with jurisdictions in their State and do not participate in multi-State exercises and training. Some plans do not include training and exercises for volunteer organizations that are a major resource in emergency response. Some States reported that they were not constrained by funding, but rather by the time available to plan and participate in training and exercises.

### Recommendations and Current Actions

- Regional exercises to test plans and decision making structures for different mass evacuation scenarios should be conducted on a regular basis to ensure that Federal, State, and local agencies are prepared to respond to different types of catastrophic incidents.

### Summary Comments

The Homeland Security Council, the U.S. House of Representatives, the U.S. Senate, and the GAO have all issued reports looking at various aspects of the Federal response to the catastrophic hurricanes that struck in 2005. These reports contain numerous recommendations on actions that could allow the Federal Government to work more effectively with State and local government in responding to future catastrophic incidents. Many of these recommendations touch on aspects of mass evacuations. The U.S. DOT, DHS, and other Federal agencies are reviewing these recommendations along with other internal and external assessments of responses to recent catastrophic incidents. As noted above, many short-term actions have already been taken, but others could require legislative changes. Potential longer-term changes are being carefully considered before any legislative proposals are sent forward.

The U.S. DOT is examining a number of specific options that will enhance its ability to respond to evacuation needs associated with catastrophic incidents. In addition to activities noted above that have already been done to prepare for the 2006 hurricane season, the U.S. DOT is examining a range of potential longer-term options including ways to organize itself better to respond to catastrophic incidents and ways to enhance the contribution of various U.S. DOT programs to improve State and local evacuation capabilities. Once decisions have been made on how best to accomplish any needed U.S. DOT organizational and programmatic changes and those changes have been assessed in terms of their contribution to overall Federal response capabilities, required legislative proposals will be made.

## **Appendix A: Secretary of Transportation's Letter to the Governors Requesting Copies of State and Local Evacuation Planning Documents**

This appendix provides a copy of the letter Secretary Norman Y. Mineta sent to the governors of the following States requesting their assistance with this study:

- State of Alabama
- State of Arkansas
- State of Florida
- State of Georgia
- State of Louisiana
- State of Mississippi
- State of Oklahoma
- State of Tennessee
- State of Texas



THE SECRETARY OF TRANSPORTATION  
WASHINGTON, D.C. 20590

January 13, 2006

The Honorable Haley Barbour  
State of Mississippi  
Jackson, MS 39205

Dear Governor <sup>Haley:</sup> ~~Barbour~~:

The 2005 hurricane season had a tremendous impact on Mississippi and other States throughout the Gulf Coast region, and we empathize with the challenges that you and your citizens have faced. The U.S. Department of Transportation (DOT) is committed to supporting recovery efforts across the region and improving our ability to respond to future catastrophic events.

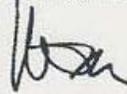
This letter is to request your assistance in conducting an assessment of evacuation plans for hurricanes and other catastrophic events impacting the Gulf Coast region. Section 10204 of the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (P.L. 109-59) calls for DOT and the U.S. Department of Homeland Security (DHS), in coordination with Gulf Coast and contiguous States, to review and assess Federal and State evacuation plans and report our findings and recommendations to Congress. This report is due to Congress by June 1.

At the President's direction, DHS is also conducting a broader review of emergency preparedness plans for all 50 States and the Nation's 75 largest metropolitan areas to assess ways to improve overall preparedness. In order to avoid duplication, DOT is working closely with DHS to coordinate our assessment with this broader review.

DHS has already contacted each State's homeland security advisor to obtain information about its emergency preparedness plans. DOT will also use that information as the basis for our review of State evacuation plans. In addition, I may need your help in obtaining the evacuation plans from local jurisdictions – primarily counties – in your State. This information will be of critical importance in conducting our assessment. In order to help facilitate this work, I would appreciate it if you would provide a liaison in your office. Please identify your liaison to Mr. Jim March at 202-366-9237 or [Jim.March@fhwa.dot.gov](mailto:Jim.March@fhwa.dot.gov). Once DOT has obtained copies of all relevant State and county plans, it will evaluate them against a list of criteria developed by experts in hurricane evacuation.

I am sure that you appreciate the importance of this effort. DOT intends to complete this report before the 2006 hurricane season, and I look forward to working with you and your colleagues in neighboring States to explore ways to improve our Nation's hurricane preparedness. Should you have any questions about our study, please feel free to contact Mr. March.

Sincerely yours,



Norman Y. Mineta

## **Appendix B: State, Parish, and County Agency Plans Included in the Assessments**

The U.S. DOT acquired copies of the evacuation plans through three means: (1) the DHS National Planning Review, (2) the Secretary of Transportation's letter to the Governors, and (3) direct contact with State and local emergency managers or transportation officials. The U.S. DOT also consulted with the State emergency management agencies to validate that the plans provided for review included all relevant plans available in each State. While evacuation plans were not available from every jurisdiction, the U.S. DOT collected evacuation planning documents from each of the Gulf Coast States and from more than 54 percent of the State, county, and parish plans identified for the study. The set of collected plans provided a sufficient base from which to assess the overall adequacy of evacuation planning for those areas in the Gulf Coast region with the greatest threat of catastrophic hurricanes.

The team received 82 plans, 63 of which have been assessed and ranked, as presented in Table B-1. The remaining 19 plans were deemed incomplete as essential information pertaining to evacuation-related processes and planning was missing. Consequently, these documents have not been reviewed and are listed in Table B-2. In addition, four host states (i.e., Arkansas, Georgia, Oklahoma, and Tennessee) were evaluated against criteria that focused on the sheltering of evacuees.

**Table B-1 - State, Parish, and County Plans Included in the Assessment**

<b>No.</b>	<b>State</b>	<b>State, Parish, and County Plans</b>
1	Alabama	State
2		Mobile
3	Florida	Alachua County
4		Bay County
5		Bradford County
6		Broward
7		Calhoun
8		Charlotte
9		Clay
10		Collier
11		Duval
12		Flagler
13		Franklin
14		Glades
15		Hillsborough
16		Indian
17		Leon
18		Liberty
19		Madison County
20		Martin
21		Miami-Dade
22		Monroe
23		Okaloosa County
24		Orlando
25		Orange
26		Pasco
27		Pinellas
28		Santa Rosa
29		St. Johns
30		Suwannee
31		Volusia
32		Walton County
33		State

No	State	State, Parish and County Plans	
34	Louisiana	Acadia Parish	
35		Ascension Parish	
36		Concordia Parish	
37		Iberia Parish	
38		Jefferson Davis	
39		Jefferson Parish	
40		Lafayette Parish	
41		Lafourche Parish	
42		Livingston Parish	
43		New Orleans	
44		Plaquemines	
45		St. Charles	
46		St. Bernard	
47		St. Helena	
48		St John the Baptist Parish	
49		St. James Parish	
50		St. Martin Parish	
51		St. Mary Parish	
52		State	
53		Mississippi	Harrison
54			Jackson
55	Pearl River		
56	Pike		
57	Stone		
58	State		
59	Texas	Fort Bend	
60		Harris	
61		Montgomery	
62		Nueces County (Corpus Christi)	
63		State	

**Table B-2 - State, Parish and County Plans Not Included in the Assessment**

<b>No</b>	<b>State</b>	<b>County/Parish</b>
1	Florida	Baldwin
2		Baker
3		Brevard
4		Escambia
5		Hardee
6		Lake
7		Lee
8		Manatee
9		Nassau
10		Palm Beach
11		Polk
12		Seminole
13		Washington
14	Louisiana	St. Tamany
15		Tangipahoa
16		Washington
17	Texas	Live Oak
18		Tarrant
19		Travis

## Sheltering States Assessments

Four host states were evaluated against criterion that focused on the sheltering of evacuees. Oklahoma, Georgia, and Tennessee provided complete plans, and Arkansas provided its National Plan Review response.

## Appendix C: Evaluation Methodology and Evaluation Criteria

Congress requested the U.S. DOT, in cooperation with the DHS, to “review and assess Federal and State evacuation plans (including the costs of the plans) for catastrophic hurricanes and other catastrophic events impacting the Gulf Coast Region and report its findings and recommendations to Congress.” To meet the Congressional requirements for this study, the U.S. DOT developed a systematic, analytical process to evaluate the readiness and adequacy of State and local jurisdictions to move people in the Gulf Coast region away from catastrophic events and to safe shelter. The U.S. DOT’s methodology included several major steps to collect information, evaluate and validate the criteria and results, and develop findings and recommendations to improve catastrophic evacuation planning in the Gulf Coast region and nationwide. These steps are described in more detail later in this chapter.

Hurricane evacuation plans are prepared at various levels of government including State, county, and municipal, and may be prepared by a variety of agencies ranging from a State DOT, to a State emergency management agency, to a municipal public works agency, or even to a State highway patrol agency. For the evaluation of the adequacy of State and local evacuation plans, the U.S. DOT collected and assessed the plans from various agencies within a State as well as neighboring jurisdictions that were involved, and also assessed how they coordinated their plans across geographic and political boundaries.

### Overall Methodology

The assessment process was built on the following steps:

- *Assessing against criteria.* The team evaluated the State and local evacuation plans against common criteria, not against each other. The team’s analysts began by carefully identifying the seven key areas that are most important in achieving evacuation planning goals — decision making and management, evacuation planning, public communications and preparedness, operations, sheltering considerations, and training and exercise. In each area, the team then identified the characteristics of effectively managed evacuation processes and framed these as questions that became the rating factors.
- *Refining the factors.* The team then identified subfactors, again framed as questions, that further refined each of the general evaluation questions. For example, a state that manages decision making well would have established processes for large-scale evacuations. A state with strong training and exercise programs would have plans with provisions for training a volunteer cadre.
- *Collecting the most important information on the questions.* The team then assembled information related to each of the questions including current Federal guidelines and examples of good practice from various sources.
- *Analyzing the information through a collaborative process.* The team of analysts and subject matter experts jointly analyzed and discussed the data and its implications. They combined their information and jointly assigned ratings for each of the plans.

- *Conducting the process in transparent fashion.* From the very beginning, the evaluation team committed to a process of transparency. The project's researchers and analysts consulted extensively with all involved officials before defining the criteria. Along the way, the team provided regular status updates on its progress.

## Criteria Development

Developing the evaluation questions against which to assess the Gulf Coast region's evacuation plans requires (among other things) an understanding of the transportation requirements needed to support evacuations, the characteristics of the underlying incident, and the transportation resources available to respond to the incident. A decision to evacuate residents, visitors, and businesses due to an approaching hurricane is not a decision for transportation agencies. Emergency management and senior elected officials make that decision. However, transportation personnel are a key resource for planning and operating a safe and successful evacuation.

The U.S. DOT developed evaluation questions that focus on State and local actions necessary to plan for and implement a mass evacuation. These actions include written policy directives; coordination of planning processes; and provisions made to communicate information to evacuees before, during, and after evacuation. The developed questions were used for the detailed review of individual written evacuation planning documents from the jurisdictions in the Gulf Coast region. The criteria were also reviewed and validated during the discussions with the State and local officials during the site visits.

Questions based on current Federal guidance were drawn from multiple sources including FEMA SLG 101: Guide for All-Hazard Emergency Operations Planning, HSPD-5: Management of Domestic Incidents, NIMS, and NRP, Volunteer and Donations Management Support Annex. Additional questions were developed based on factors cited in SAFETEA-LU; the FY 2006 DOT Appropriations Act; findings from recent government reports including the Task Force Report to the Texas Governor and the White House, House of Representatives, Senate, and GAO reports on the Hurricane Katrina response. Section 10204 of SAFETEA-LU and the FY 2006 DOT Appropriations Act included specific factors that were a part of this evaluation, such as the potential modes of transportation in evacuations, coordination with neighboring jurisdictions, and communications before and during evacuations. Additional transportation factors developed by the U.S. DOT ensure full consideration of transportation agency roles in mass evacuations.

The eight factors identified in the legislation that were reflected in the evaluation questions are as follows:

1. All safe and practical modes of transportation available for evacuations;
2. The extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions'
3. Methods of communicating evacuation plans and preparing citizens in advance of evacuations;
4. Methods of coordinating communication with evacuees during plan execution;

5. The availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes;
6. The time required to evacuate under the plan;
7. The physical and mental strains associated with the evacuation; and
8. The cost of the plan.

Table C-1 shows how Congressional study criteria apply to seven key elements.

**Table C-1. Legislative Factors and Evaluation Questions Related to Seven Key Elements of Evacuations**

Factors from Section 10204 SAFETEA-LU and FY 2006 DOT Appropriations Act	Evaluation Questions
<b>Key Element: Mass Evacuation Decision Making and Management</b>	
<ul style="list-style-type: none"> <li>• All safe and practical modes of transportation available for evacuations.</li> <li>• The time required to evacuate under the plan.</li> <li>• The cost of the plan.</li> <li>• The extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan describe direction and control with respect to mass evacuation?</li> <li>• Does the plan describe the provisions needed to execute a large-scale evacuation?</li> </ul>
<b>Key Element: Evacuation Planning</b>	
<ul style="list-style-type: none"> <li>• The extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions.</li> <li>• The cost of the plan.</li> <li>• The time required to evacuate under the plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan address evacuation planning considerations (e.g., decision making, communications, available transportation modes, special needs, and sheltering) with regard to catastrophic hurricanes and other catastrophic events?</li> <li>• Does the plan require organizations to prepare standard operating procedures that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks?</li> <li>• Does the plan include provisions for returning evacuees to their homes?</li> </ul>
<b>Key Element: Public Communications and Preparedness for Mass Evacuations</b>	
<ul style="list-style-type: none"> <li>• Methods of communicating evacuation plans and preparing citizens in advance of evacuations.</li> <li>• Methods of coordinating communications with evacuees during plan evacuation.</li> <li>• The physical and mental strains associated with evacuations.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan describe the provisions and methods for alerting citizens that evacuation may be necessary?</li> <li>• Does the plan identify what will be done to keep evacuees informed during evacuation to reduce their level of mental and physical stress?</li> <li>• Does the plan describe the means the government will use to keep evacuees and the public informed on the specific actions they should take after the evacuation has started?</li> </ul>

Factors from Section 10204 SAFETEA-LU and FY 2006 DOT Appropriations Act	Evaluation Questions
<b>Key Element: Evacuation of People with Special Needs in a Catastrophic Event</b>	
<ul style="list-style-type: none"> <li>• All safe and practical modes of transportation available for evacuations.</li> <li>• Methods of communicating evacuation plans and preparing citizens in advance of evacuations.</li> <li>• The time required to evacuate under the plan.</li> <li>• The physical and mental strains associated with evacuations.</li> <li>• Methods of coordinating communications with evacuees during plan evacuation.</li> <li>• The availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan describe provisions for evacuating special needs residential populations (e.g., people with physical, mental, cognitive, and developmental disabilities) including those in assisted living facilities and hospitals, and those living independently?</li> <li>• Does the plan describe provisions for evacuating other special needs populations?</li> </ul>
<b>Key Element: Mass Evacuation Operations</b>	
<ul style="list-style-type: none"> <li>• All safe and practical modes of transportation available for evacuations.</li> <li>• The time required to evacuate under the plan.</li> <li>• Methods of coordinating communications with evacuees during plan evacuation.</li> <li>• The availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes.</li> <li>• The physical and mental strains associated with evacuations.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan describe the safe and practical transportation modes that will be used to move evacuees that cannot transport themselves (other than special needs populations)?</li> <li>• Does the plan include provisions to ensure the availability of public and commercial transport modes and necessary transport operators?</li> <li>• Does the plan identify evacuation routes?</li> <li>• Does the plan address the use of contraflow measures?</li> </ul>
<b>Key Element: Mass Evacuation Sheltering Considerations</b>	
<ul style="list-style-type: none"> <li>• The availability of food, water, restrooms, fueling stations, and shelter opportunities along the evacuation routes.</li> <li>• The extent to which the evacuation plans are coordinated with the point receiving the evacuated personnel.</li> <li>• The physical and mental strains associated with evacuations.</li> <li>• Methods of coordinating communications with evacuees during plan evacuation.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan require the establishment of mutual-aid agreements with other jurisdictions to formalize access to and use of shelters?</li> <li>• Does the plan include provisions for informing shelter operators and evacuees about the locations of public shelters outside of the evacuation area and their status (e.g., full, accepting evacuees, accepting evacuees with pets, special needs shelters, etc.)?</li> <li>• Does the plan address strategies and responsibilities for shelter operations?</li> <li>• Does the plan include provisions for the care and protection of animals?</li> </ul>
<b>Key Element: Mass Evacuation Training and Exercises</b>	
<ul style="list-style-type: none"> <li>• All safe and practical modes of transportation available for evacuations.</li> <li>• The extent to which evacuation plans are coordinated with neighboring States and adjoining jurisdictions.</li> <li>• The time required to evacuate under the plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the plan include provisions for training a volunteer cadre to support shelter management operations, transport of evacuees, and first-aid stations along the evacuation routes, etc.?</li> <li>• Does the plan require periodic reviews and updates of the plan, exercises, and after-action reports as part of the planning process?</li> </ul>

Table C-2 lists the 20 criteria developed by the U.S. DOT for this study. For each of the criteria, a list of attributes (stated as questions) was developed to define and support the parameters of each criterion. The criteria were grouped according to the seven key elements of catastrophic evacuation planning and operations. These elements are major categories of activities or functions that local, State, and Federal emergency management agencies would conduct to plan and execute a catastrophic evacuation.

**Table C-2. Catastrophic Evacuation Plan Evaluation Questions**

<b>Decision Making and Management</b>		
<b>Criteria</b>		<b>Question</b>
D1	Does the plan describe direction and control with respect to catastrophic evacuation?	a. Does the plan identify organizations and individuals (by position) responsible for providing data to support the evacuation decision?
		b. Does the plan identify organizations and individuals (by position) responsible for reviewing these data, including the condition of the transportation infrastructure, and making evacuation recommendations to decision maker(s)?
		c. Does the plan identify organizations and individuals (by position) responsible for issuing and amending evacuation orders?
		d. Does the plan identify organizations and individuals (by position) responsible for executing and coordinating overall evacuation operations?
		e. Does the plan identify organizations and individuals (by position) responsible for directing resources to execute evacuation orders?
		f. Does the plan identify organizations and individuals (by position) responsible for authorizing/releasing information to media and the public?
		g. Does the plan identify roles and responsibilities of different levels of government, and how these government agencies coordinate their efforts with each other?
		h. Does the plan identify specific roles of the State and local transportation and law enforcement agencies in evacuation operations?
		i. Does the plan identify variation(s) in direction and control for different types of catastrophic events that require evacuation?
D2	Does the plan describe the provisions needed to execute a large-scale evacuation?	a. Does the plan define specific criteria for issuing either voluntary or mandatory evacuation orders?
		b. Does the plan contain pre-approved drafts of executive orders for evacuations?
		c. Does the plan address amending or revising the evacuation orders?
		d. Does the plan describe time-phasing of evacuation execution (i.e., sequential and concurrent activities) for different levels of evacuation response?
		e. Does the plan identify specific contingency plans that can be used if conditions change during the course of an evacuation?
		f. Does the plan contain provisions to announce closings of schools and businesses in the risk area?

		g. Does the plan contain provisions to identify the number of evacuees that will require transportation assistance?
		h. Does the plan contain a strategy for special needs populations?
		i. Does the plan contain a strategy for securing and restricting access to evacuated areas?
<b>Planning</b>		
<b>Criteria</b>		<b>Question</b>
P1	Does the plan address evacuation planning considerations (i.e., decision-making, communications, available transportation modes, special needs, and sheltering) with regard to catastrophic events?	<p>a. Does the plan address the catastrophic hazards that would cause a large-scale evacuation?</p> <p>b. Based on the catastrophic hazards, does the plan identify and prioritize the communities that should be evacuated?</p> <p>c. Based on the catastrophic hazards, does the plan identify the number of people and vehicles to be evacuated?</p> <p>d. Based on the catastrophic hazards, does the plan identify decision points/triggers for implementation of evacuation?</p> <p>e. Based on the catastrophic hazards, does the plan identify the estimated time needed to complete the evacuation, and is this coordinated with highway, law enforcement, and transit agencies?</p> <p>f. Based on the catastrophic hazards, does the plan identify the distance evacuees must travel to ensure their safety?</p> <p>g. Based on the catastrophic hazards, does the plan identify the estimated time public sheltered evacuees will need support?</p> <p>h. Does the plan require tasked organizations to identify, obtain, and maintain resources and equipment required to support all aspects of the evacuation (e.g., evacuating people that do not have their own means of transport, evacuating special needs populations, communicating information to the public, managing traffic flow, etc.)?</p> <p>i. Does the plan include host communities in disaster declarations?</p> <p>j. Does the plan require periodic reviews and updates of the plan, exercises, and/or drills, and after-action reports as part of the planning process?</p>

P2	Does the plan require organizations to prepare standard operating procedures that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks?	a. Does the plan require organizations to prepare standard operating procedures that contain the detailed instructions that responsible individuals need to follow to accomplish assigned tasks?
P3		b. Does the plan address procedures in place for handling re-entry, and communicating these to the public?
		c. Does the plan include provisions for transporting evacuees back to their place of residence?
		d. Does the plan identify personnel resources and equipment required to support re-entry?
		e. Does the plan include provisions for assisting evacuees in reuniting with family members?
<b>Public Communications and Preparedness</b>		
<b>Criteria</b>		<b>Question</b>
C1	Does the plan describe the provisions and methods for alerting citizens that evacuation may be necessary?	a. Does the plan contain provisions to manage timely communication of evacuation instructions to prepare citizens in advance of the order to evacuate?
		b. Does the plan identify contingency plans for use if normal means of public communications are unavailable?
		c. Does the plan provide for communicating with people that have limited English proficiency?
		d. Does the plan include provisions for communicating with special needs evacuees (e.g., people with hearing, vision, and physical impairments) and the means to communicate?
		e. Does the plan provide for keeping the public informed of the estimated travel times to safe haven under current conditions?
		f. Does the plan address the communication of alternative routes and/or transportation modes?
		g. Does the plan contain sample/prescribed messages for use?
C2	Does the plan identify what will be done to keep evacuees informed during evacuation to reduce their level of mental and physical stress?	a. Does the plan address informing evacuees of available transportation modes, how to access them, and any restrictions on what evacuees may carry with them?
		b. Does the plan address informing evacuees about when transportation assistance will begin and end and the frequency of departure at designated pick-up locations?
		c. Does the plan establish times for public officials to provide updates, and does the plan address informing the public on when to expect such updates?
		d. Does the plan address informing evacuees of their destination before boarding public transport?

		<ul style="list-style-type: none"> <li>e. Does the plan address informing the public and/or family members of evacuee destination?</li> <li>f. Does the plan address providing the public with information about available services along evacuation routes and at shelters?</li> <li>g. Does the plan identify established web sites, hotlines, etc. where people can get answers to their questions/concerns?</li> <li>h. Does the plan address communicating security measures to the public so they are not concerned about possessions left behind?</li> <li>i. Does the plan identify support services that are available for those with special needs?</li> </ul>
C3	Does the plan describe the means the government will use to keep evacuees and the public informed on the specific actions they should take after the evacuation has started?	<ul style="list-style-type: none"> <li>a. Does the plan indicate that highway conditions are reported on emergency radio announcements for travelers en route?</li> <li>b. Does the plan identify Intelligent Transportation System (ITS) resources that are used to communicate to the public (e.g., 511, changeable message signs, highway advisory radio, web sites, etc.)?</li> <li>c. Does the plan address contingency plans in place if normal means of communications are unavailable?</li> </ul>
<b>Evacuation of People with Special Needs</b>		
<b>Criteria</b>		<b>Question</b>
N1	Does the plan describe provisions for evacuating special needs populations including those in assisted living facilities, hospitals, and those living independently (e.g., people with physical, mental, cognitive, and developmental disabilities)?	<ul style="list-style-type: none"> <li>a. Does the plan include provisions for movement of required assisted devices such as wheelchairs, life support systems, service animals, and communication equipment?</li> <li>b. Does the plan identify special needs populations in the community by geographic location (e.g., hospitals, nursing homes, assisted care facilities, etc.)?</li> <li>c. Does the plan contain provisions for coordination with the most appropriate community outreach agencies to transport special needs populations?</li> <li>d. Does the plan contain a policy with respect to bringing service animals and pets to shelters or on board transit vehicles, planes, helicopters, etc.?</li> <li>e. Does the plan include provision for sheltering these evacuees?</li> </ul>
N2	Does the plan describe provisions for evacuating other special needs populations (e.g., people in schools, day centers, mobile home parks, prisons, and detention centers, as well as people that do not speak English or who are tourists, seasonal workers, or homeless)?	<ul style="list-style-type: none"> <li>a. Does the plan make provisions for schools and day care centers?</li> <li>b. Does the plan make provisions for mobile trailer parks and campgrounds?</li> <li>c. Does the plan make provisions for incarcerated residents (e.g., those in prisons, jails, juvenile facilities, and drug treatment centers)?</li> <li>d. Does the plan make provisions for transient populations (e.g., vacationers, seasonal workers, homeless, etc.)?</li> <li>e. Does the plan make provisions for non-English speaking evacuees?</li> </ul>

Operations		
Criteria		Question
O1	Does the plan include provisions to ensure availability of public and private transport modes and necessary transport operators?	a. Does the plan include monitoring evacuation operations of motorized transport, rail, air, water, and other modes of transportation to determine the adequacy of available resources?
		b. Does the plan address contingency plans for obtaining additional evacuee transport vehicles, if needed?
		c. Does the plan provide coordination to prevent over-tasking of transportation resources where neighboring jurisdictions also require support from the same resource provider?
		d. Does the plan address coordination with the next higher level of government (local to State, and State to Federal) to ensure unmet transportation resource needs are identified and requested to support evacuations?
		e. Does the plan address the use of standby contracts with motor coach companies, paratransit providers, ambulance companies, railroads, air carriers, etc., to obtain drivers and vehicles to fill identified transportation shortfalls?
O2	Does the plan describe the safe and practical transportation modes that will be available to move evacuees that cannot transport themselves (other than special needs populations)?	a. Is the plan coordinated with the agencies and organizations that are tasked to provide transportation resources?
		b. Does the plan include the use of public transit vehicles, school buses, and paratransit vehicles?
		c. Does the plan include the use of non-government agency vehicles (e.g., church buses, volunteer group vehicles, etc.) as a contingency?
		d. Does the plan identify accommodations for the transport of luggage, etc., and how evacuees are informed about any restrictions or limitations?
		e. Does the plan address provisions made to transport evacuees to pick-up points/staging areas?
O3	Does the plan identify evacuation routes?	a. Does the plan require routes to be designated, marked, and communicated to the public?
		b. Does the plan address the safety of routes (e.g., roads, bridges, railways, waterways, airstrips, etc.) that will be used?
		c. Does the plan identify the provisions made to monitor traffic conditions on the evacuation routes and make operational adjustments as appropriate to maximize throughput?
		d. Does the plan require critical operational changes be communicated to the Emergency Operations Center (EOC) and the public?
		e. Does the plan identify provisions to control access to evacuation routes and manage traffic flow?

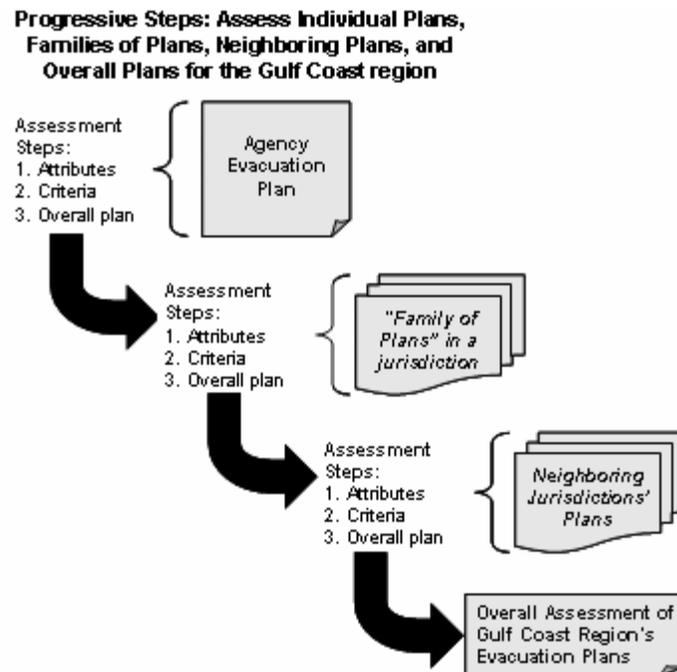
		<ul style="list-style-type: none"> <li>f. Does the plan address strategies and responsibilities for maintaining evacuation route capacity, especially with regard to work zones, toll collection, vehicle incidents, etc.?</li> <li>g. Does the plan identify a system for notifying and coordinating with neighboring jurisdictions about what routes will be used and when?</li> <li>h. Does the plan address strategies and responsibilities for providing food, water, restrooms, fueling stations, and rest stations for evacuees along the evacuation routes, including those for special needs populations?</li> <li>i. Does the plan include resource lists to support evacuation routes (including all resource needs identified above)?</li> </ul>
O4	Does the plan address the use of contraflow measures?	<ul style="list-style-type: none"> <li>a. Does the plan contain specific contraflow plans that have been developed and coordinated with all affected parties?</li> <li>b. Does the plan address strategies for emergency responders, transit vehicles, and other essential equipment to move inbound against the predominant outbound flow?</li> <li>c. Does the plan address communicating information to the public on the contraflow plans and the beginning and ending times for contraflow operations?</li> <li>d. Does the plan identify a system for communicating and coordinating contraflow operations to neighboring jurisdictions?</li> <li>e. Does the plan indicate that the contraflow plans have been tested in an exercise or drill, or in a real evacuation?</li> </ul>
<b>Sheltering Considerations</b>		
<b>Criteria</b>		<b>Question</b>
S1	Does the plan require the establishment of mutual-aid agreements with other jurisdictions to formalize access to and use of shelters?	<ul style="list-style-type: none"> <li>a. Does the plan indicate whether the agreements provide for sufficient spaces to house the worst-case estimate for the number of evacuees that will need shelter?</li> <li>b. Does the plan include provisions for notification and coordination with host communities, non-governmental organizations, and other risk communities to address shelter activation and operations?</li> </ul>
S2	Does the plan include provisions for informing shelter operators and evacuees about the locations of public shelters outside of the evacuation area and their status (e.g., full, accepting evacuees, accepting evacuees with pets, special needs shelters, etc.)?	<ul style="list-style-type: none"> <li>a. Does the plan contain a system for keeping shelter information current during the evacuation?</li> <li>b. Does the plan contain a system for acquiring and communicating information to evacuees on the availability of non-public shelters such as hotels?</li> <li>c. Does the plan include provisions for keeping shelter operators informed on the location and status of alternate shelters?</li> <li>d. Does the plan require travel routes to the shelters and the shelters to be marked?</li> </ul>
S3	Does the plan address strategies and responsibilities for shelter operations?	<ul style="list-style-type: none"> <li>a. Does the plan provide for food, water, and sanitation at shelters?</li> <li>b. Does the plan provide for first aid and mental health support at shelters?</li> </ul>

		<ul style="list-style-type: none"> <li>c. Does the plan provide for security at shelters?</li> <li>d. Does the plan provide for disaster welfare information at shelters?</li> <li>e. Does the plan provide for special needs population sheltering?</li> <li>f. Does the plan provide for distinct population sheltering?</li> <li>g. Does the plan include a resource listing and capabilities to support shelter operations included in the above elements?</li> <li>h. Does the plan provide for refuges of last resort?</li> </ul>
S4	Does the plan include provisions for the care and protection of animals?	<ul style="list-style-type: none"> <li>a. Does the plan include provisions to evacuate people and their companion animals?</li> <li>b. Does the plan contain policy with respect to sheltering pets?</li> <li>c. Does the plan address communicating to the public the locations of shelters that accept pets and if they are equipped to meet the needs of pets?</li> <li>d. Does the plan address measures for trying to reconnect families with their pets?</li> <li>e. Does the plan address provisions for identifying and evacuating other animals (e.g., animals in farms, kennels, veterinary hospitals, zoos, theme parks, pet stores, and university laboratories)?</li> </ul>
<b>Mass Evacuation Training and Exercises</b>		
<b>Criteria</b>		<b>Question</b>
T1	Does the plan include provisions for training a volunteer cadre to support shelter management operations, transport of evacuees, and first aid stations along the evacuation routes, etc.?	<ul style="list-style-type: none"> <li>a. Does the plan provide for trained personnel to support shelter management operations?</li> <li>b. Does the plan provide for trained personnel to support the evacuation route (food, first aid, information, etc.)?</li> </ul>
T2	Does the plan require periodic reviews and updates of the plan, exercises, and after-action reports as part of the planning process?	<ul style="list-style-type: none"> <li>a. Does the plan require periodic reviews and updates of the plan, exercises, and after-action reports as part of the planning process?</li> </ul>

## General Approach

The study methodology, illustrated in Figure C-1, started with an assessment of individual plans, followed by an assessment and comparison of the family of plans, which included the individual plans and the coordination with neighboring jurisdictions. The complete list of plans included in the assessment is presented in Appendix C.

**Figure C-1. Evacuation Plan Assessment Approach**



The individual plan reviews included three steps that began with a detailed assessment of individual attributes, and then “rolled up” the information to increasingly higher levels for an overall assessment. The first step examined how the plan addressed the evaluation attributes of each criterion. The second step weighted the attributes for each criterion to provide an assessment of that criterion. The third step evaluated the 20 criteria to give an overall assessment of how well the plan meets the criteria. The individual steps are described in more detail below.

*Step 1: Detailed assessment of how the plans address the individual attributes for each question.*

Each attribute is scored on a scale of 0 to 3.

- 0 = the attribute was not met in the plan
- 1 = the attribute was only partially met in the plan
- 2 = the attribute was completely met in the plan
- 3 = the plan exceeds the requirements of the attribute, and is a potential best practice.

*Step 2: Scoring of the degree to which the plan addresses each question.*

The scores from each attribute were sorted into essential and non-essential. The scores from Step 1 for each essential attribute were added and then divided by the total number of essential attributes within a given question to determine the average weighted score for that question. This produced a weighted score for each of the 20 questions for the plan.

*Step 3: Assessment of plans based on the cumulative results of the ratings.*

Each question is given a rating, and the plans are assessed based on the cumulative results of the ratings. The overall evacuation plan criteria ratings are listed in Table C-3.

**Table C-3. Ratings Used in the Assessment**

<b>Rating</b>	<b>Description</b>
4	All essential attributes are rated as "Meets" or higher, and all non-essential attributes are rated as "Partially meets" or higher.
3	At least 75% of essential attributes are rated as "Meets" or higher, and non-essential attributes are rated as "Does not meet."
1	No more than 50% of the essential attributes are rated as "Partially meets," and less than 25% of the non-essential attributes are rated as "Does not meet."
0	More than 25% of the essential attributes are rated as "Does not meet."

#### **Definitions**

**Attributes:** Detailed questions to describe and define the parameters of each criterion.

**Essential:** If the attribute is not met, fulfilling the criteria and executing the evacuation is at serious risk of failure.

**Non-Essential:** Fulfilling the criteria and executing the evacuation may be impaired or degraded if the attribute is not met, but will not result in failure by itself.

## **Evaluation Consistency**

The evaluation forms, guidelines and instructions, a keyword search list, daily team review and reporting, and evaluation methodology training ensure consistency across the evaluations. Before beginning actual reviews, all team members reviewed and assessed a single "family of plans" to test the template and determine whether it is being applied consistently by the reviewers. Adjustments were made to the instructions and template as necessary.

The team identified keywords for searching the documents to allow the reviewers to focus on key aspects of the evacuation plan and, therefore, reduce the amount of time spent on reviewing non-key portions of the plans. A worksheet template was developed for plan reviewers' use in capturing their evaluations, and was used to document relevant facts applicable to the rating assigned to each plan or family of plans assessed. The plan review team compiled a qualitative assessment of their evaluation findings against the defined list of evaluation criteria using a ranking tool to indicate the degree of integration of each question in the plan. The result of the

assessments yielded a snapshot of the strengths and weaknesses of each plan reviewed. The team has also compiled the rating across the plans to observe trends and identify common problems that exist throughout the region.

## Appendix D: Agencies and Participants in State and Local Meetings

The contractor team prepared for the State Visits by prioritizing and organizing state details, notifying the participants, and then scheduling the visits in cooperation with the DHS. The contractor team worked with the U.S. DOT to schedule the site visits, which occurred as follows:

- March 22, 2006 – Jackson, Mississippi
- March 24, 2006 - Tallahassee, Florida
- April 3-6, 2006 – New Orleans, Louisiana
- April 10-11, 2006 – Baton Rouge, Louisiana
- April 24, 2006 – Austin, Texas
- May 11, 2006 – Montgomery, Alabama

State and local representatives (typically State DOT, emergency management officials, highway patrol and state police, and local emergency management officials) participated in the collaboration meetings. The following pages provide a list of participants for each meeting.

<b>State Visit – Mississippi March 22, 2006</b>
<i>Agency/Dept.</i>
Mississippi Highway Patrol
Mississippi National Guard
Mississippi Emergency Management Agency
Mississippi Office of Homeland Security
Mississippi Department of Public Safety
Federal Highway Administration
U.S. DOT Office of the Secretary
Mississippi Department of Public Safety
Mississippi Department of Transportation
Federal Aviation Administration
Mississippi Department of Health

<b>State Visit – Tallahassee, FL March 24, 2006</b>
<i>Agency/Dept.</i>
Florida Department of Transportation ESF 1/3
ESF 1
Federal Aviation Administration
ESF 16
Federal Highway Administration
Florida Department of Emergency Management
Florida Department of Transportation ESF 8
Florida Department of Law Enforcement

<b>Florida County Emergency Managers – Conference Call April 3, 2006</b>
<b><i>Agency/Dept.</i></b>
Florida Department of Community Affairs
Clay County
Lake County
Hillsborough County
Indian River County
Pinellas County

<b>State Visit – New Orleans, LA April 4, 2006</b>
<b><i>Agency/Dept.</i></b>
Department of Homeland Security
Dir. Homeland Security, City of New Orleans
Dir. of Emergency Medical Services, City of New Orleans
Nationally Recognized Emergency Medical Technician- Paramedic, Medical Liaison
New Orleans Office of Emergency Preparedness Emergency Response Coord.,
New Orleans Office of Emergency Preparedness, Executive Assistance to the Director of Homeland Security
New Orleans Office of Homeland Security, Community Preparedness Planner
New Orleans Office of Homeland Security
New Orleans Office of Homeland Security, Terrorism Early Warning Program Mgr
Federal Railroad Administration
Office of HS, NOFA Liaison
New Orleans Police Department, Department of Homeland Security, Community Hall

<b>State Visit – Louisiana State Police (LSP) Troop "B" April 4, 2006</b>
<b><i>Agency/Dept.</i></b>
LSP.B
LSP.L
Louisiana Department of Transportation
U.S. Department of Transportation
Office of Homeland Security

<b>State Visit – Plaquemines Parish, LA April 5, 2006</b>
<b><i>Agency/Dept.</i></b>
Department of Homeland Security (DHS)/OEP
Department of Homeland Security
Federal Emergency Management Agency
Federal Railroad Administration
Federal Emergency Management Agency
PPG

<b>State Visit – Plaquemines Parish, LA April 5, 2006</b>
<i>Agency/Dept.</i>
PPG EMS
East Jefferson General Hospital/EMS
PPG/ H/S
PPG/ H/S

<b>State Visit – Jefferson Parish, LA April 6, 2006</b>
<i>Agency/Dept.</i>
JP EOC
Department of Homeland Security
Federal Railroad Administration

<b>State Visit – Baton Rouge, LA April 10, 2006</b>
<i>Agency/Dept.</i>
Dept of Health & Hospital Deputy Asst Sec 3
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DSS Emergency Preparedness Coordinator
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Louisiana State Police
GOHSEP Preparedness Section Chief
GOHSEP Operations
GOHSEP/LANG Homeland Security Grant Prog. Mgr.

<b>State Visit – Baton Rouge, LA April 11, 2006</b>
<i>Agency/Dept.</i>
Governor’s Office of Homeland Security and Emergency Preparedness (GOHSEP) Operations

<b>State Visit – Austin, TX April 24, 2006</b>
<i>Agency/Dept.</i>
Texas Department of Transportation
Federal Highway Administration
Texas Office of Homeland Security
Texas Governor’s Division of Emergency Management

<b>State Visit – Montgomery, AL May 11, 2006 <i>Agency/Dept.</i></b>
Alabama Department of Transportation
Alabama Emergency Management Agency
Alabama Department of Human Resources
Federal Highway Administration – AL
Alabama Department of Public Safety
Alabama Department of Transportation – Division 9
Mobile Co. Emergency Management Agency
Baldwin Co. Emergency Management Agency

## **Appendix E: Best Practices**

Throughout the completion of this report, the U.S. DOT identified many lessons learned and best practices in the Gulf Coast States and beyond using the plan evaluations, State visits, and literature search as resources. In this appendix, the U.S. DOT has expanded upon some of the best practices that were found.

While the wide variety of best practices range from a technology solution to a Governor's Executive Order, they do share one commonality—the recognition that the plans and tools used to execute evacuations need to be revised to maintain their effectiveness. In all of these examples, there is an underlying belief that the public can always be served better.

### **Texas Task Force Addresses Concerns About Decision Making and Management and Other Important Issues**

The Texas Task Force on Evacuation, Transportation, and Logistics was established in direct response to the evacuation concerns brought on by Hurricanes Katrina and Rita during the Fall of 2005. Texas Governor Rick Perry, Houston Mayor Bill White, and Harris County Judge Robert Eckels established the Task Force to improve evacuation procedures for major cities in Texas. In a September 30, 2005 press release from the Office of the Governor, Governor Rick Perry stated, “This task force brings together some of the best and brightest minds in transportation, energy, academia and government who will help all levels of government learn from the experiences of Rita and establish better evacuation plans for future emergencies.” With the increased attention on the Gulf Coast States, events took place that defined lessons learned and recommendations to better address evacuations.

To gather information for its final report, the Task Force held public hearings almost once a week from October 25, 2005 until December 13, 2005. During the public hearings, the Task Force invited State and local officials and additional stakeholders including evacuees, school officials, charitable organizations, relief workers, hospitals, medical personnel, individuals with special needs, and their caregivers. The Task Force also offered citizens the opportunity to give testimonies. Meeting locations varied in Texas cities such as Houston, Fort Worth, Corpus Christi, South Padre, San Antonio, and Beaumont.

The final Task Force report was released on February 14, 2006, and included the following key areas that were the items most often addressed during the public hearings. Each area included a narrative on concerns, findings, and recommendations.

1. Command, control, and communication
2. Evacuation of people with special needs
3. Fuel availability
4. Flow of traffic
5. Public awareness.

As a result of the final report recommendations, Texas Governor Rick Perry issued the Executive Order RP57 on March 21, 2006. This executive order has led to the implementation of some of the Texas Task Force recommendations that were included in the final report. The executive order instructs respective offices and officials on their roles and responsibilities regarding the recommendations being enacted. It provides that the State Director of Homeland Security will ensure the executive order is carried out consistent with the final report and recommendations of the Texas Task Force.

### **Command, Control, and Communications**

The Emergency Management Directors including county judges and mayors within each of the state's 24 Council of Governments will be responsible for establishing a Regional Unified Command Structure (RUCS). Each region will have an Incident Commander that will be the point of contact within the region during the disaster response, including mass evacuation. As stated by the Executive Order, each RUCS will be established by April 18, 2006. Also, the name of a person and qualifications of the Incident Commander should go to the Governor's Division of Emergency Management by April 20, 2006. The Texas Department of Public Safety will be the lead in command, control, and communications and other operational tasks, as directed by the Governor, during evacuations and other disaster response operations that involve multiple RUCSs.

The Executive Order also cites many tasks for the Governor's Division of Emergency Management including:

- Creating eight Regional Response Teams (RRTs) to support multi-jurisdictional operations.
- Developing a statewide hurricane evacuation and shelter plan.
- Overseeing the implementation of regional responses and evacuation plans within the State.
- Coordinating with independent school districts and public colleges, universities, and the university system to provide transportation and facilities to support the execution of state and local evacuation and shelter plans. (In addition, the Governor's Division of Emergency Management will develop policies for reimbursement to school districts and public colleges, universities, and university systems for evacuation, shelter and transportation expenses.)
- Leading and directing annual hurricane evacuation exercises.

### **Evacuation of People with Special Needs**

The Governor's Division of Emergency Management will coordinate with the Department of State Health and Human Services, the Department of Aging and Disability Services, the Governor's Committee on People with Disabilities, and other state agencies to define special needs and develop an evacuation and shelter plan that supports the requirements of the people with special needs. The above agencies, along with appropriate stakeholder groups, will work to develop criteria for the evacuation plans for special needs facilities, including both licensed and unlicensed facilities. The plan will also address the special needs population and the evacuation and sheltering needs of their service animals.

Additional tasks for the Governor's Division of Emergency Management include:

- Ensuring local jurisdictions and RUCSs approve evacuation plans maintained by special needs facilities.
- Developing and implementing a statewide database to assist in the evacuation of people with special needs, especially jurisdictions on the coast having priority. Each RUCS will be responsible for collecting and providing information for the database.

### **Fuel Availability and Distribution**

The Texas Department of Transportation will coordinate with the Texas Oil and Gas Association and other industry partners to develop a plan to address fuel availability along major evacuation routes and establish a fuel operations function in the State Operations Center to coordinate the distribution of fuel prior to and during evacuations.

- Tasks for the Governor's Division of Emergency Management include:
- Working with local officials to develop evacuation plans that address fuel availability during an evacuation
- Establishing fuel procedures for distribution during an emergency like an evacuation
- Developing policies and procedures at the Division of Emergency Management to reimburse local governments and other support entities for evacuation fuel-related expenses in the event that the Texas Legislature or United States Congress designates funding for that purpose.

### **Traffic Control and Management**

The Texas Department of Public Safety will oversee traffic management of the evacuation routes during multi-jurisdictional evacuations. Also, the Texas Department of Public Safety, in coordination with the Department of Homeland Security and the United States Customs and Border Patrol, is taking steps to expedite the flow of traffic through checkpoints on major hurricane evacuation routes and assist in the development of traffic management plans to accommodate mass populations at checkpoints.

Tasks for the Texas Department of Transportation include:

- Coordinating with the Texas Department of Public Safety to develop contraflow plans for major hurricane routes that were identified by the Texas Task Force final report
- Implementing short- and long-term solutions to reduce congestion on the one-lane section of the U.S. Highway 290 at Brenham, Texas, during evacuations.
- Starting the implementation of the infrastructure projects recommended in the March 2005 report to the Governor on Texas Hurricane Preparedness. (The report addresses the obstructions on evacuation routes during mass evacuations.)

## Public Awareness

The Public Utility Commission is to work with utility companies that are regulated by the Commission and serve counties in hurricane evacuation zones to include hurricane preparedness and evacuation-related public awareness information in monthly billing statements prior to and during the hurricane season each year.

## Additional Sources

The following documents and resources were used to research this best practice:

- Executive Order RP57 on implementing recommendations from the Governor’s Task Force on Evacuation, Transportation, and Logistics. March 21, 2006. <http://www.governor.state.Texas.us/divisions/press/exorders/rp57/view>.
- Governor’s Task Force on Evacuation, Transportation and Logistics Final Report to the Governor. February 14, 2006. <http://www.governor.state.Texas.us/divisions/press/files/EvacuationTaskForceReport.pdf>
- Berger, Eric. “Houston Area Must Quickly Pick Disaster Command.” *The Houston Chronicle*. March 22, 2006. <http://www.chron.com/disp/story.mpl/front/3739709.html>.
- Hughes, Polly Ross. “Heat Is on to Improve Plans for Evacuations.” *The Houston Chronicle*. March 25, 2006. <http://www.chron.com/disp/story.mpl/metropolitan/3747550.html>.

## Mississippi and North Carolina Departments of Health Collaborate on After-Action Report

A key component of the planning process is the completion of after-action reports. The purpose of after-action reports is to document the significant outcomes following a major event or exercise, and then integrate the findings into emergency management plans and standard operating procedures so that the problems encountered are mitigated during future response. All levels of government, nonprofit organizations, and the private sector engage in the after-action process.

In addition to the after-action reporting carried out by the Mississippi Emergency Management Agency (MEMA), lead agencies for annexes to the State’s emergency management plan are in the process of finalizing their own after-action reports. One example is the Mississippi Department of Transportation (MDOT). Although its final report has not been released yet, MDOT has already identified the need to manage its fuel resources during all stages of a disaster more efficiently and effectively. As a result, MDOT will likely procure advanced reserves. MDOT is also reviewing how it works with the MEMA emergency operations centers as well as it own. MDOT typically produces an after-action report following every hurricane season. The after-action report for 2005 is even more important since Katrina has changed the transportation landscape, creating situations that State officials have not had to deal with in the past.

One challenge of developing an after-action report is balancing the subjectivity. Often, reviews are limited to internal sources, avoiding the risk that an outside expert may not be able to fully understand what occurred during the disaster. Ideally, there would be a peer review system. The Mississippi Department of Health (MDOH) and North Carolina Office of Emergency Services (OEMS) are in the process of developing a peer review system for the ESF-8: Public Health and Medical Services after-action report.

Mississippi and North Carolina have a history of exchanging resources during disasters. For instance, the North Carolina Department of Health deployed 458 healthcare professionals to its field hospital in Waveland, Mississippi, following Hurricane Katrina through the EMAC system. North Carolina met other requests for assistance in Mississippi and Louisiana as well. This put North Carolina in a position to review the execution of Mississippi's ESF-8 since North Carolina's own resources were on the ground during the event, and the staff already understood the after-action report process from experiences in their own State. The OEMS also leveraged partnerships with Duke University, the University of North Carolina-Chapel Hill (UNC-CH), and several other North Carolina State agencies to conduct an in-depth analysis of what happened to Mississippi's sheltering system after the storm. In the coming weeks, an after-action report will be released with findings and recommendations that will be much more detailed than MDOH could have done on its own. Mississippi's ability to provide sheltering assistance to its residents will be greatly improved as well.

Not only is OEMS's review of MDOH's actions during Hurricane Katrina an opportunity for exchange at the professional level, it is an example of how States continued to share their resources long after the event has passed. Throughout the after-action report process, MDOH has only been responsible for the travel costs for North Carolina officials and researchers to come to Mississippi. North Carolina's State agencies participating in this process pay the salaries and other expenses for its staff members. Rather than viewing this as an additional cost, the North Carolina OEMS and its partners saw it as an opportunity to explore their own roles and responsibilities during a catastrophic event and review their own plan while promoting "win-win" collaboration at the State level.

This after-action report project also demonstrates the number of organizations that could be involved in post-event analysis. For instance, the list of agencies that the North Carolina OEMS led during the past few months includes, but is not limited to:

- North Carolina Division of Emergency Management, Public Health Preparedness and Response
- Department of Environmental and Natural Resources, Division of Facility Services
- Office of Emergency Medical Services
- Public Health Regional Surveillance Teams from Forsyth and Cumberland Counties
- Office of Citizens Services
- Hospitals, including the State Medical Assistance Team Commander from Duke University
- EMS systems

- State Medical Examiners Office
- UNC-CH public health researchers.

Because of the in-depth level of analysis for the MDOH after-action report, MDOH has also worked independently of North Carolina's study to address some of the problems it encountered last summer. While, in some cases, preliminary findings may be released, MDOH wants to be sure that the findings are as objective as possible when the final report is released around June 1, 2006. MDOH intends to incorporate as many of the after-action report's recommendations as possible based on its ability to fund and implement them.

Some changes that MDOH is already working on in advance of the 2006 hurricane season include the designation of community colleges as shelters and the development of a partnership to improve the identification of the deceased. MDOH has reached out to community college presidents to pre-determine sites and buildings that could be used as special needs shelters. The goal is to place 100 to 120 special needs beds at each community college along with the requisite food, water, power supplies, and staff. The community colleges will also provide appropriately trained staff and students, including LPNs, RNs, and respiratory therapists, to serve at these new shelters.

Following Hurricane Katrina, MDOH felt the need to increase the speed of identification of the victims of the hurricane and its aftermath. While they were able to utilize the Disaster Mortuary Operational Response Team through federal assistance, MDOH believes response can improve by partnering with the Mississippi Coroners' Association and the Mississippi Department of Public Safety's Bureau of Investigation. Currently, the State Comprehensive Emergency Management Plan (CEMP) appoints one person to be in charge of identification of the deceased. In the case of Katrina, this proved to be too much for one person. By sharing the responsibility among three organizations, MDOH hopes to improve the speed of identification and alleviate the burdens previously placed on a small group of people. These improvements combined with the recommendations from the after-action report should strengthen Mississippi's plan for sheltering in the coming years.

### **Contacts**

The following individuals provided information that contributed to the development of this practice:

- Bob Chapman, Mississippi Department of Transportation
- Art Sharpe, Mississippi Department of Health
- Holli Hoffman, North Carolina Office of Emergency Medical Services.

## **Louisiana Organization Provides Public Education in 21 Parishes**

The Terrebonne Parish Readiness and Assistance Coalition (TRAC) was born out of a call to action in response to Hurricane Andrew in 1992. As this community pulled together to help

rebuild and raise homes for those in need, the founders of TRAC, 28 community organizations including emergency management, religious groups, and hospitals partnered to prepare and educate area residents. Ninety percent of the parish is wetlands or covered by open water. Many of the people in the area are low income and have language barriers.

From that point forward, TRAC began developing community-specific outreach materials about preparedness and mitigation techniques. In 1998, TRAC received a Hazard Mitigation Grant from the Hazard Mitigation Grant Program through the Louisiana Office of Emergency Preparedness, allowing them to design hurricane preparedness campaigns in 13 southeast Louisiana parishes. This campaign included preparedness programs in local nursing homes, childcare centers, day camps, schools, Boy Scout troops, and church groups, as well as public service announcements (PSAs) broadcast on the radio and educational materials distributed through newspapers, hardware stores, and grocery stores.

Today, TRAC serves 21 parishes throughout southern Louisiana through a comprehensive public education campaign that includes print, television, radio, Web, and personal education and outreach. Updated in 2005 (prior to Hurricane Katrina), each part of the campaign reminds Louisiana residents that they must be prepared for hurricanes and corresponding evacuations.

Much of the information that TRAC provides its residents could be used as baseline information for other disasters and by people who live in other parts of the country. It does not differ significantly from publications like FEMA's *Are You Ready* guide. What TRAC does is convey the risks associated with hurricanes into the context of Louisianans' geography and attitudes. This includes describing the long history of devastation and destruction of hurricanes in the State, including the storm that hit Chenier Caminanda in 1893 and Hurricane Betsy in 1965. TRAC also recognizes the geographic changes of Louisiana in recent years, explaining to residents that the Gulf is much closer to them and their homes than it was in the past. The combination of these elements in its campaign drives home the message that many of the things that make Louisiana unique in a positive way also put it at increased risk.

In addition to TRAC's general public education campaign, TRAC developed tools and resources for primary school-aged children. Andy and Allie Alligator provide guidance for children through stories, an interactive Web site, a curriculum for teachers, and the song "Pack, Board Up, and Boogie." The same preparedness messages and information are transformed into a fun context so that kids can help their families remember everything that needs to be done in advance of a storm—including checking on the neighbors and "granny," and leaving well ahead of a storm's landfall.

TRAC's public education resources are quite extensive and have required a significant investment of financial resources over the past 14 years. Communities interested in providing at least some basic information about emergency preparedness, but unable to produce something as comprehensive as TRAC, should leverage resources like FEMA's *Are You Ready* guide and the [Ready.gov](http://Ready.gov) brochure.

Local communities, companies, and governments can download these resources and add their own logos and contact information for distribution to residents. If you live or work in southern Louisiana and would like to work with TRAC to reprint or distribute its materials, visit [www.trac4la.com](http://www.trac4la.com) or call 877-TRAC-4-LA.

TRAC also provides translations of most of its print and multimedia resources in French, Spanish, and Vietnamese as part of its efforts to ensure that it can reach all Louisianans. Part of TRAC's current efforts includes utilizing software that will automatically translate materials from English to the other three predominant languages in Louisiana. TRAC leaders are seeking resources to print hard copies of its materials in these additional languages through the local libraries and community organizations.

As TRAC has developed over the past 14 years, its leaders have learned that the messenger can be as important as the method of delivery. Peg Case, TRAC's Executive Director, learned that not all audiences will listen to her. However, a group of off-shore oil workers, for example, will listen to TRAC's message if their manager delivers it. As many studies have shown, people are more likely to listen to those they consider credible sources of authority.

Using FEMA Hazard Mitigation Grants and corporate donations, TRAC provides its *Louisiana Storm Survival Guide* through several outlets. TRAC realized early on that it could not rely on parish emergency management agencies alone to distribute its materials to residents. Over the years, TRAC has developed formal and informal distribution networks that include public libraries, Councils on Aging, home health networks, and direct response to anyone who calls the TRAC office. Web site visitors may choose to download the guide and other materials, or use the searchable online database to find the nearest library where they can pick one up. TRAC's efforts to broaden its distribution channels helped alleviate the potential "additional" work added onto emergency managers. Because of its distribution network, TRAC was able to distribute more than 260,000 copies of its guide in 2005.

The *Louisiana Storm Survival Guide* covers all stages of the storm cycle, from preparing homes prior to evacuation to providing New Orleans contraflow maps. It also provides information on tornadoes and thunderstorms—other common threats to Louisianans.

In addition to the *Louisiana Storm Survival Guide*, TRAC has published and produced the following as part of its *Campaign for Storm Safe Louisiana*:

- *Vanishing Coast, Vanishing Safety...Surviving Louisiana Storms*: A 30-minute preparedness program available on VHS and DVD. The video walks viewers through TRAC's 10-Step Hurricane Survival Plan.
- *Teaching Disaster Readiness to Louisiana Kids*: An instructor's guide for teaching children about storm preparedness.
- *Andy and Allie Hurricane Series*: A children's series developed to help prepare and cope with hurricane threats.
- *Disaster Preparedness for the Elderly and Disabled*: An instructor guide available for healthcare professionals with an elderly and/or disabled clientele.
- *The Buddy Guide*: Information for residents who want to learn how to help friends or neighbors who might need assistance in preparing for storms.

To help reach even more of Louisiana's residents, TRAC works with television stations and cable providers to broadcast PSAs. Currently, two announcements are available in four languages. These PSAs serve as a stark reminder to Louisianans that they are at risk.

A key component of everything that TRAC produces and prints is its toll-free number. TRAC's limited staff and volunteers make every effort to answer and/or return each call received. These personal points-of-contact provide the opportunity to talk with the inquirer about their specific situation and needs. The service also helps create a connection between the caller and preparedness because there is a real human on the other end—not just an answering machine. TRAC realizes that each caller has a story to share. Every inquiry is logged into a database for future reference and analysis.

### **After Hurricane Katrina**

In the initial days after Hurricane Katrina, TRAC's employees found themselves in the unique position of having a working Web site and phone lines once they returned home. Many found TRAC on the Internet, and were looking for a way to help or get in contact with people in the area. TRAC responded by putting up an online database for volunteering and donations.

During the past few months, TRAC has focused on its other mission—mitigation. Since its founding in 1992, TRAC has worked to help individuals and groups rebuild or repair their homes to better survive the inevitable catastrophic storms and flooding. TRAC's success has resulted in a partnership with OxFAM to help expand this program and resources. One area under mitigation that TRAC's Executive Director Peg Case would like to provide more information on is the importance of having the right type of insurance. Without it, many will not be able to rebuild and move on.

In terms of its public education campaign, TRAC realizes that it needs to revise its videos and print materials to reflect the new realities and sensitivities. The organization is currently assessing the funding necessary to accomplish this goal. In the meantime, TRAC is still distributing the *Louisiana Storm Survival Guide* through local libraries and other partners. Although the landscape has changed, much of the information that residents need to know remains the same.

### **Additional Sources**

The following documents and resources were used to research this practice:

- The TRAC Website. The site includes all resources listed in the practice.
- Peggy Case, TRAC Executive Director
- FEMA and the State of Louisiana. *Promoting Mitigation in Louisiana Performance Analysis*. March 5, 2002.
- Lewis, Joshua. "Louisiana Group Eyes Future Disasters." Disaster News Network. May 23, 2000.
- Dunn, Travis. "Interfaith Helps LA Survivors." Disaster News Network. March 11, 2003.

## Alabama Successfully Implements Contraflow Plan, Then Reviews

With the annual threat of hurricanes and the need to prepare for other types of evacuation events, researchers and DOTs have been developing and refining contraflow plans for highway systems for many years. Contraflow plans, generally intended for large-scale events, enable transportation managers to increase capacity by reversing the traffic direction of one side of the highway.

The State of Alabama's Department of Transportation (ALDOT) developed its contraflow plan for Interstate 65 (I-65) several years ago, including a step-by-step checklist that ALDOT, the Alabama Department of Public Safety (ADPS), the Alabama Emergency Management Agency (AEMA), and other stakeholders utilize to implement the plan. Each year ALDOT, ADPS, and AEMA exercise the plan prior to hurricane season to test its systems, and serve as a refresher for those who have responsibilities if and when the plan is implemented. This year, the exercise will take place from May 17 to 18, 2006. The first day of the exercise involves the mobilization of personnel throughout the State and stepping up the alert system. The second day actually exercises the implementation of the contraflow plan, including manning all 30 traffic control points.

The Alabama Contraflow Plan includes the pre-positioning of dedicated equipment on trailers such as variable message signs in ALDOT's District Offices located close to the I-65 corridor. This plan addresses the need for additional resources throughout the State during an evacuation. While detailed, the plan is not rigid—to allow personnel in the field to make decisions on the ground.

The strength of the Alabama Contraflow Plan is partly due to the fact that ALDOT works with its partners to identify and apply lessons learned to the plan at the end of every hurricane season. This implementation has become more important during the past two years. While the contraflow plan existed for several years, it was not subject to a “real-life” test until Hurricane Ivan in September 2004. After their experience with Ivan, officials in Alabama recognized that:

- The real traffic conditions challenged the contraflow plan's gaps and assumptions identified during previous exercises
- Modifications to the northern terminus location, traffic, and traffic control in Montgomery needed to be made
- Although traffic volume was light, extrapolations to larger events meant that competing traffic movements needed to be reduced by splitting interchanges
- The intention to implement the plan on a response basis was false—the mere presence of ALDOT personnel contributed to the formation of queues, and to public outcry at the perceived failure of the contraflow plan
- Reversing traffic on the day of landfall put personnel and traffic control devices at risk once winds reached 35 miles per hour.

Alabama's experiences with contraflow during Hurricane Ivan resulted in an improved plan, and prepared the State for a successful evacuation in July 2005 before Hurricane Dennis struck. By this point, the contraflow plan had been switched to a schedule-based system. Governor Riley announced to the public that lane reversal would only be available 8:00 a.m. to 5:00 p.m. on July 9. By scheduling the implementation of contraflow, personnel have time to get into position, clear the road, and stop lane reversal before nightfall. The limitation of contraflow to a day also helps with staffing issues as any extension would require identification and commitment of a complete second shift of personnel to contraflow, when they are needed elsewhere in the State.

Following Hurricane Dennis, ALDOT and its partners at AEMA and ADPS were ready to implement contraflow again for Hurricane Katrina before the storm turned towards Mississippi and Louisiana. Officials monitored the situation until they could make the decision not to implement a lane reversal.

As the State undergoes preparations for the 2006 hurricane season, it is also integrating additional changes to its contraflow plan. Officials are continuing to improve traffic patterns at the northern terminus. ALDOT and ADPS are collaborating to better define the roles and responsibilities of transportation personnel and state troopers acting in the field. One thing that Alabama officials have realized during the past two years is that the vehicles of state troopers are better suited to clear traffic—the public recognizes their vehicles and lights, and troopers have arrest authority that ALDOT personnel do not.

In addition to using the real-life experiences of Hurricanes Ivan and Dennis, ALDOT has refined the way it collects feedback following its annual exercise. Due to the length of the exercise and the requirement for many to travel overnight, ALDOT dismisses its participants immediately following the exercise. Officials realized that after two days, many people could not effectively contribute to a lengthy post-exercise briefing. ALDOT now asks participants for their comments via email, which not only has increased the response rate, but also has improved the completeness and relevancy of the comments. Because the quality of the feedback has been improved, it is easier to integrate the lessons learned and address identified gaps in the contraflow plan.

Other areas that Alabama recognizes as challenges to its contraflow plan include public perception of how fast traffic should move and the geography of its highway system. Media reports from the ground may find drivers who think that it will take between two and three hours to travel from the coast to Birmingham, a distance of approximately 250 miles. More realistic estimates would be a travel time of four hours during normal traffic, and seven to eight hours during periods of heavy traffic, including contraflow. Recognizing this problem, officials are looking at ways to improve media relations, and creating a brochure similar to Mississippi's.

The problem of Alabama's highway geography is more difficult to address. U.S. Route 31, the designated southbound route for responders and transportation personnel during contraflow, basically runs parallel to I-65. While there are many places where east-west connections between U.S. 31 and I-65 are relatively close, there are times that the distance between the two highways is more than 20 miles. Furthermore, U.S. 31 and other secondary roads serve as access to evacuation routes from the Alabama coast and Florida Panhandle. Traffic jams have

developed in small towns and at intersections, affecting the entire highway system. Stretches of I-65's shoulder lanes could be dedicated to emergency vehicles. However, several bridges only have two-foot-wide shoulders, making it dangerous, if not impossible, for responders to travel against the contraflow traffic consistently. This is one reason why contraflow plans are meant to be implemented only in extreme situations.

ALDOT recognizes that their neighboring States' contraflow plans must account for a larger evacuating population as well as an increased number of people who do not own their own vehicles. Alabama experiences relatively less traffic from the coast, a significant portion of which is driven by tourists who have their own vehicles. Similar to comprehensive emergency management plans, contraflow plans must take into account the demographic and geographic features of the jurisdictions they serve.

### **Additional Sources**

The following documents and resources were used to research this practice:

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- FEMA National Situation Update: Sunday, July 10, 2005.
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- Wolshon, Brian, Elba Urbina, and Marc Levitan. "National Review of Hurricane Evacuation Plans and Policies." LSU Hurricane Center. 2001.
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- The White House. "The Federal Response to Hurricane Katrina – Lessons Learned." February 2006.

## **Florida Uses GIS Technology to Aid in Collecting and Sharing Sheltering Information**

A key component of Florida's State Emergency Response Team (SERT) is its use of GIS technology. One way that that SERT uses GIS is to collect and provide information about open and closed shelters throughout the State to responders, government officials, and the public.

At the present time, one can access the State Emergency Operations Center (SEOC) Mapper database via [http://www.eoonline.org/EM\\_Live/shelter.nsf](http://www.eoonline.org/EM_Live/shelter.nsf) to view a list of open and closed shelters, the availability of space at special needs shelters, and other relevant details. The longitude and latitude coordinates of shelters are pre-populated to allow for quicker updating. County officials may choose to input updated data about shelter availability via the Web or by calling the SEOC where the GIS team can enter information directly into the database. This information is updated frequently during a disaster, assisting emergency managers, first responders, and the public to receive the important information they need about the availability of shelters. Information from the Mapper program may be used by local officials to update the media about shelter availability, and help them decide where to place variable message signs (VMS) along major evacuation routes to direct people to shelters.

In addition to knowing where shelters are opened or closed, shelter operators rely on the outputs of models such as HURricane EVACuation (HURREVAC), Consequence Assessment Tool Set (CATS), and Hazards US Multi-Hazards (HAZUS MH) to decide on the anticipated need for shelters inside and outside the zone of the storm's impact. Each model provides an information layer that can be processed and posted to the SEOC secure site accessible by all county officials in Florida. Model results from CATS include population impacts as well as damage to 27 different types of infrastructure, while HAZUS MH data includes damage cost estimates, debris amounts, and an estimate of the number needing shelter. The information on the secure site also contains information on evacuation routes and critical infrastructure that may be of importance when conducting a non-storm-related evacuation. Because SEOC Mapper is Web accessible, it is available anywhere where a connection can be established. For instance, some of the team that Florida sent to Mississippi in the aftermath of Hurricane Katrina worked with the GIS team to obtain information using satellite phones to establish Internet connections.

Since the 2004 hurricane season, the SERT GIS team has begun developing the next iterations of the SEOC Mapper database, the first of which is targeted to be released around the beginning of June 2006. One of the GIS team's goals is to produce and provide real-time data. As the GIS team worked to improve back-end processes and redundancies, including moving to a multiple server system, it took into the account input from after-action reports and county emergency managers. One of the short-term improvements is to develop a more user-friendly system that will encourage more county officials to input shelter information directly into the system. The GIS team also hopes to provide a publicly available dynamic mapping system that will show only shelters that are open. Upon the release of the next version of the SEOC Mapper, the GIS team will provide training for system users.

In addition to these improvements, the GIS team hopes to provide the public with additional features, including a search by address function as found on popular Internet search engines, surge zones, shelters, and the real-time overlay of watch and warning zones. This will provide the public with the opportunity to learn the risks to their homes during a hurricane or tropical storm. GIS staff have also recently sought training on how to broaden its use of the HAZUS model to include flood situations and other disasters—all of which may require shelters to be opened in safe locations for evacuees.

## Contacts

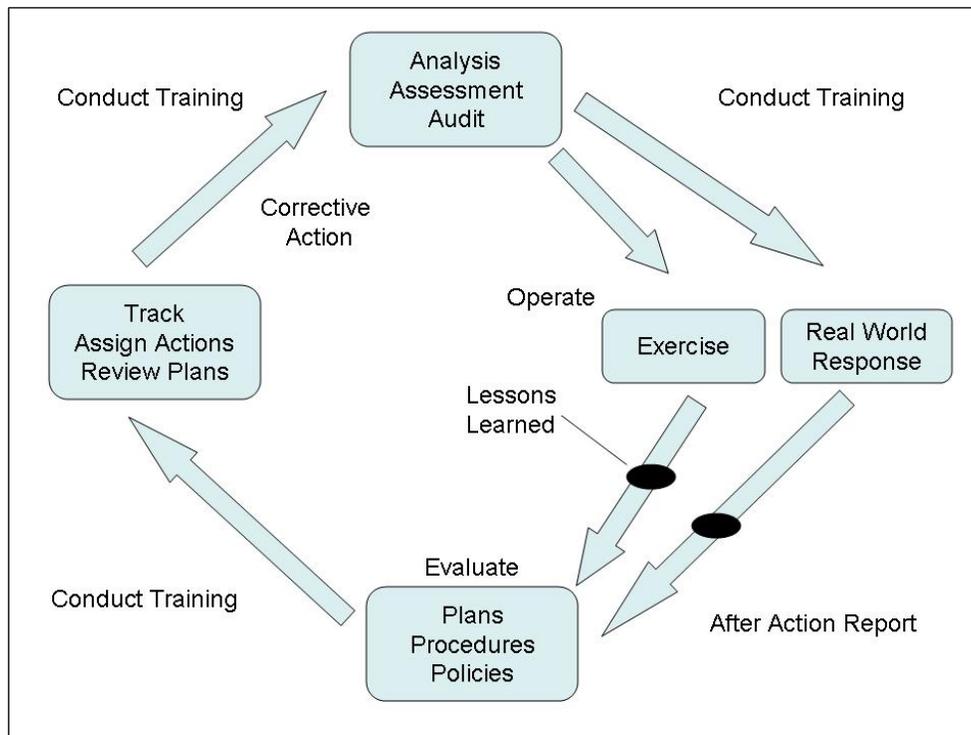
The following individuals provided information that contributed to the development of this practice:

- Patrick Odom, Florida Division of Emergency Management
- Arvil White, Florida Division of Emergency Management.

## Orange County, Florida Support Emergency Management Plan with Training and Exercises

Orange County, Florida, has established an annual exercise program to determine the ability of local governments to respond to emergencies. This training and exercise program is coordinated by the Orange County Office of Emergency Management (OEM). County departments and authorities, municipalities, and all other public and private emergency response agencies also bear the responsibility of ensuring that personnel with emergency responsibilities are sufficiently trained. The Orange County CEMP also requires that all agencies take necessary steps to ensure appropriate records are kept reflecting the emergency training received by their personnel. This program consists of four parts:

1. **Training Program** – Under this program, OEM will coordinate all disaster preparedness, response, recovery and mitigation training provided to county personnel by the Florida Division of Emergency Management (FDEM) and FEMA. OEM will also provide schedules of the State emergency management training courses to appropriate county agencies. Applications for State and FEMA training courses will be submitted to the Executive Director of Emergency Management for approval and submission to FDEM. This includes training for local emergency response personnel. As part of the training program, the county has an Emergency Management Program Specialist (Education and Training) who is the point of contact for providing and coordinating the training and exercise cycle depicted in Figure H-1.



**Figure H-1. Orange County Florida, Exercise and Training Cycle**

2. **Exercise Program** – Under this program, OEM ensures county disaster plans and procedures are exercised and evaluated on a continuing basis. Exercise after-action reports are completed and provided to participating agencies to ensure corrective action is taken. Subsequent exercises ensure previous discrepancies are reevaluated. Orange County’s exercise and training program tries to involve public and private agencies with emergency response functions. Emergency management officials of adjoining counties may be invited to participate or observe when appropriate. Representatives from county, municipalities, and State and Federal agencies in the local area, as well as non-governmental agencies (e.g., Red Cross, Salvation Army, United Way, etc.) participate and share information on respective roles and responsibilities during disasters.
3. **Exercise and Training Requirements** – Annually, OEM conducts a large-scale mass casualty exercise including pre-exercise planning meetings and a post-exercise critique. This includes the conduct of an annual hurricane exercise, which may be held in conjunction with a State-sponsored hurricane exercise. Other exercises include one or more emergency responder exercises involving mass casualties under various scenarios (e.g., Hazmat, transportation accident, natural disaster, terrorist act, etc.). The exercises also include hurricane briefings; emergency management activities; and hurricane preparedness and training meetings with the County Administrator and staff, department heads, municipal officials, and all other governmental and private emergency response agencies. Hurricane and emergency management seminars are conducted as requested. In support of ongoing training, the OEM conducts disaster-planning meetings with hospitals, nursing homes and

assisted living facilities, shelter agencies, emergency transportation representatives, and home health care agencies.

4. **Public Awareness and Education** – In this aspect, county officials work to keep residents informed about disaster preparedness, emergency operations, and hazard mitigation. Public information in the disaster preparedness and emergency management area is divided into three phases—continuing education, pre-disaster preparation, and post-disaster recovery and mitigation.

### **Additional Sources**

The following documents and resources were used to research this practice:

- Orange County (Florida) Fire Rescue Department Office of Emergency Management and Emergency Support Function Planning Group. Orange County Comprehensive Emergency Management Plan. Updated May 1, 2003.
- Orange County Government, Florida. Emergency Planning Website. 2006.

## Appendix F: Hurricane Evacuation Models and Tools

Over the past four decades of transportation infrastructure expansion and with the 9/11 disaster response and recent hurricane impacts, researchers and emergency management personnel have sought to better understand and predict the characteristics of evacuations. This research has led to the development of several models, which have contributed to planning for evacuations and, to a lesser extent, to the operational execution of evacuations. The following summarizes the current and most prominently applied models and tools used in two different contexts:

1. **Operational Tools for Hurricane Modeling and Information Sharing**
  - a. SLOSH (Sea, Lake, and Overland Surges from Hurricanes)
  - b. HURREVAC (HURricane EVACuation)
  - c. HAZUS-MH (HAZards US Multi-Hazards)
  - d. CATS/JACE (Consequence Assessment Tool Set/Joint Assessment of Catastrophic Events)
  - e. ETIS (Evacuation Traffic Information Systems)
2. **Analytical Tools for Transportation Modeling and Analysis**
  - NETVAC (NETwork emergency eVACuation)
  - MASSVAC (MASS eVACuation)
  - OREMS (Oak Ridge Evacuation Modeling System)

While designed, developed, and deployed with different functionality, data requirements, user interface, and level of expertise and training required for operations, these modeling tools can be applied to assess some common objectives.

### Operational Tools for Hurricane Modeling and Information Sharing

The most widely applied flooding model for evacuation analysis is the SLOSH model. Developed by the NWS to predict hurricane storm surge for a given set of conditions (e.g., hurricane strength, wind speed, and direction of movement, geography), it is also used to help plan evacuation routes and locate emergency shelters based on estimates of which geographic areas could be flooded under certain storm scenarios.<sup>54</sup> The NHC, in coordination with Federal, State, and local organizations, has developed SLOSH models for over 38 water basins along the Atlantic and Pacific Ocean coastal areas; with 14 “SLOSH Basins” covering the state of Florida.<sup>55</sup>

HURREVAC is a model developed specifically for hurricane evacuations. The model was developed on behalf of FEMA by the USACE for use by emergency managers. The model is applied as an open ocean path tracking and projection tool while a hurricane is approaching and projects the anticipated course once it makes landfall. It is an operational tool, assisting decision makers in advance of and during an evacuation. HURREVAC draws information from a wide variety of sources including the NHC, inundation estimates from the SLOSH model, and information on the location, remaining capacity, and flooding potential of all the shelters in the

area. It also estimates the time required to evacuate an area, which emergency managers use in determining when to commence evacuations.<sup>56</sup>

HAZUS-MH, developed by FEMA, is a loss estimation and risk assessment program covering earthquakes, hurricanes, and flooding. By modeling the physical world of buildings and structures and then subjecting it to the complex consequences of a hazard event, users can implement this tool to prepare for a natural disaster, respond to the threat, and analyze the potential loss of life, injuries, and property damage. In the HAZUS-MH program, three levels of intensity or detail can be applied, with each level utilizing base data requiring a progression of quality and detail input from the user. A user choosing the level of implementation would likely base the decision on the funds available for data gathering and input, as well as the level of detail required in the output.<sup>57</sup> At a minimum, the model can allow a common assessment using base data taken from national publicly available data resources, and supplemented with more accurate and granular data from local users.

HAZUS-MH was utilized by Broward County, Florida Sheriff's Office personnel during Hurricane Jeanne, which struck South Florida on September 26, 2004. Utilizing wind swaths generated from FEMA's HURREVAC 2000 software program, the Sheriff's office integrated the wind data into the HAZUS application and updated the essential facilities information as it relates to public safety facilities to better gauge damage to them as well as to determine how many people would be utilizing designated shelters.<sup>58</sup>

Developed under the guidance of FEMA and the Defense Threat Reduction Agency (DTRA), the CATS/JACE software provides disaster analysis in real time with an array of information integrated from a variety of sources. The software is deployable for actual emergencies with capabilities including contingency and logistical planning as well as consequence management.<sup>59</sup>

The CATS program integrates hazard prediction, consequence assessment and emergency management tools with critical population and infrastructure data. It uses tools and data that predict the hazard areas caused by manmade events and natural disasters including earthquakes, and hurricanes. CATS assists with estimating collateral damage to facilities, resources, and infrastructure, and creates mitigation strategies for responders.<sup>60</sup>

The U.S. DOT developed ETIS, another hurricane evacuation tool, in collaboration with FEMA. Created in direct response to significant traffic congestion problems occurring in southeastern states during Hurricane Floyd's 1999 near landfall, ETIS operates on a model that combines behavioral studies, data from past occurrences, and real-time data from ongoing incidents, including weather information, evacuation percentages, and tourist occupancy rates in affected areas.<sup>61</sup>

ETIS is a GIS, Web-based tool that assists with collection and dissemination of transportation information during an evacuation. Transportation officials in each threatened state are responsible for inputting information for coastal counties on evacuation status, tourist occupancy, evacuation participation rates, and traffic count information. ETIS provides a platform for States and the FEMA Regional Operations Center to monitor the evacuation process. The system also provides a forecast of total cross-state traffic and the likely destinations of the evacuees.<sup>62</sup>

Reports generated by ETIS that can be viewed through the Web site ([www.fhwaetis.com](http://www.fhwaetis.com)) include:

1. Shelter capacity by State
2. Traffic count by State
3. Traffic volumes by corridor
4. Destination percentages by city
5. Estimated State-to-State traffic.

In addition, a series of tables and roadway-network graphics provide emergency managers with crucial information to help with decisions regarding highway lane usage and the provision of emergency services.<sup>63</sup>

For example, ETIS was used in the Texas and Louisiana Gulf Coast region to assist with the evacuation of almost 400,000 people as Hurricane Lili approached the region in October 2002. As one FEMA Region 6 Hurricane Program Manager noted, “Deploying the ETIS technology during the approach of Hurricane Lili allowed us for the first time to gather more evacuation information in one place than had ever been possible before. Information is power in a crisis situation, and Hurricane Lili gave us a glimpse of the future, where information will help avoid traffic jams that endanger the progress of emergency evacuations.”<sup>64</sup>

“The ETIS program, used in conjunction with a DOT/FEMA organized Evacuation Liaison Team, is designed to be useful in helping State and local managers anticipate State-to-State traffic.”<sup>65</sup>

U.S. DOT continues to refine ETIS with additional query capabilities on the available data in the system. During visits to Florida and Mississippi as part of this study, both States expressed their support for ETIS as a valuable tool. In addition, they recommended that U.S. DOT continue to refine ETIS to make traffic data more real-time and easier for States to upload through automatic links with the State’s Traffic Management Centers.

## **Analytical Tools for Transportation Modeling and Analysis Flow Model**

NETVAC was developed by Dr. Yossi Sheffi, Dr. Hani S. Mahmassani, and Dr. W.B. Powell at the Massachusetts Institute of Technology in 1982 as part of the reaction to the Three-Mile Island nuclear reactor incident in 1979.<sup>66</sup> While strong in terms of a response to a Point-A-to-Point-B situation, it is limited in application to hurricane evacuation, which often include multiple Points A and B. However, transportation and emergency managers may seek to use this model to analyze route selection, intersection controls, and lane management.<sup>67</sup>

MASSVAC followed NETVAC in development by Antoine G. Hobeika and Changkyun Kim in 1985, “as a simulation model designed for the analysis and evaluation of evacuation plans for urban areas threatened by natural disasters,” including floods, hurricanes, tsunamis, and other related events. It is capable of simulating the flow on highway networks and identifying the available efficient routes from a hazard area to the nearest shelters and calculating the evacuation

time for the network. It also considers traffic flow at the county macro-level, and “has been used in several applications, including a test of operational strategies for hurricane evacuations in Virginia.”<sup>68</sup>

In the mid 1990s, the Department of Energy’s Oak Ridge National Laboratories Center for Transportation Analysis developed the OREMS, “to simulate traffic flow during various defense-oriented emergency evacuations.” OREMS is based upon approved FHWA models and has been deployed to several State DOTs and other user communities, although not empirically validated by the developers in a hurricane evacuation event. OREMS is a probabilistic model that uses network characteristics that, while improved with local knowledge, can be produced with baseline data inputs. Like NETVAC, OREMS shows how a solution for one homeland security problem (terrorist incident) can be cross-applied to another (hurricanes).<sup>69</sup> OREMS takes a consequence management approach, and “encompasses those measures aimed at alleviating the physical, socio-economic, and psychological effects” of an evacuation event.<sup>70</sup> The addition of these factors to transportation network models provides a more dynamic model for evacuation planners.<sup>71</sup> The developers of OREMS see it as only a step in the process to create an intelligent consequence management (ICM) system, which would be able to leverage real-time data using wireless networks, ITS, and GIS information.<sup>72</sup> While the original OREMS can use a baseline data input, the more detailed “local” knowledge (e.g., traffic controller, road construction and maintenance status, etc.) will improve the alternatives for planners to consider. The benefit of this approach is that OREMS can produce a network analysis “on the fly,” but it is improved with more detailed data input. The challenge of this systematic approach is that a great deal of data must be first inputted, tested, analyzed, and verified before it can become operationally useful, which is time-consuming and labor-intensive for users. However, in the long term, an ICM could prove useful to evacuation planners, including those at the U.S. DOT, with a tool that can handle large-scale evacuations.

In addition to nationally focused studies, the Gulf Coast States have invested in the study of models on their own. In April 2005, the University of Central Florida Center for Advanced Transportation Systems Simulation published a study for the Florida Department of Transportation (FDOT) that “investigated the relationships between a number of identifiable components that make up emergency evacuation, and how they can be integrated into a framework for modeling hurricane events.”<sup>73</sup> These new models will serve as a scientific basis for updated regional evacuation plans.”<sup>74</sup>

## Appendix G: Texas Executive Order - RP57

*Please note the Executive Order RP57 was obtained from Texas Governor Rick Perry's Web site at <http://www.governor.state.tx.us/divisions/press/exorders/rp57>.*

**Executive Order - March 21, 2006**

**Relating to implementing recommendations from the Governor's Task Force on Evacuation, Transportation, and Logistics.**

**BY THE  
GOVERNOR OF THE STATE OF TEXAS  
Executive Department  
Austin, Texas  
March 21, 2006**

**WHEREAS**, the Governor's Task Force on Evacuation, Transportation and Logistics was appointed to document the lessons learned from the Hurricane Rita evacuation, identify key challenges of urban area mass evacuations in Texas, and recommend improvements to state, regional, and local evacuation planning and execution; and

**WHEREAS**, the Task Force conducted public hearings across Texas to gather and document input from stakeholders to develop recommendations; and

**WHEREAS**, on February 14, 2006, the Task Force issued a final report containing recommendations to improve the State's ability to plan and execute mass evacuations in the five key areas: command, control, and communications; evacuation of people with special needs; fuel availability; traffic flow; and public awareness;

**NOW THEREFORE**, I, Rick Perry, Governor of Texas, by virtue of the power and authority vested in me by the Constitution and laws of the State of Texas, do hereby order the following

**1. Direction and oversight.** The State Director of Homeland Security shall ensure this executive order is carried out in a manner consistent with the report and recommendations of the Task Force.

**2. Command, control, and communications.** To improve command, control, and communications during mass evacuations, the Emergency Management Directors (County Judges and Mayors) within each of the state's 24 Councils of Government shall establish a Regional Unified Command Structure (RUCS), and appoint a single Incident Commander for the Regional Unified Command Structure. Each Regional Unified Command Structure will be responsible for preparing for and responding to catastrophic events within the region. Each Incident Commander will be the operational commander within the region during a disaster response, including a mass evacuation. An Incident Commander will serve a term of not less than one year. The Governor's Division of Emergency Management shall oversee the implementation of the Regional Unified Command Structure throughout the state. Each Regional Unified Command Structure shall be established no later than April 18, 2006, and the

composition of regional unified command, to include the name and qualifications of the Incident Commander, shall be provided to the Governor's Division of Emergency Management no later than April 20, 2006.

The Texas Department of Public Safety shall provide to each Regional Unified Command Structure a senior-level commissioned officer with appropriate staff to represent the State as each Regional Unified Command Structure prepares for and responds to a catastrophic event within the region.

The Texas Department of Public Safety shall assume responsibility for command, control, and communications, as well as other operational tasks as directed by the Governor, during evacuations and other disaster response operations that involve multiple Regional Unified Command Structures.

The Governor's Division of Emergency Management shall create eight Regional Response Teams (RRTs) to support multi-jurisdictional operations during catastrophic events.

The Governor's Division of Emergency Management shall develop a statewide hurricane evacuation and shelter plan to save lives and reduce the vulnerability of Texans in the event of disasters.

The Governor's Division of Emergency Management shall oversee the implementation of regional response and evacuation plans throughout the state.

The Governor's Division of Emergency Management shall coordinate with independent school districts and public colleges, universities and university systems to provide transportation assets and facilities to enable the execution of state and local evacuation and shelter plans.

The Governor's Division of Emergency Management shall develop policies and procedures to reimburse school districts and public colleges, universities and university systems for evacuation, shelter, or transportation-related expenses in the event that the Texas Legislature or United States Congress designates funding for this purpose.

The Governor's Division of Emergency Management shall direct an annual hurricane evacuation exercise to test the readiness of state and local evacuation and sheltering plans in the event of a disaster.

**3. Evacuation of people with special needs.** To ensure the safe and efficient evacuation of Texans with special needs in the event of a disaster, I hereby direct the Governor's Division of Emergency Management to coordinate with the Department of State Health Services, the Department of Aging and Disability Services, the Governor's Committee on People with Disabilities, and other appropriate state agencies to define the term "special needs," and develop a statewide evacuation and shelter plan for persons with special needs.

The Governor's Division of Emergency Management shall coordinate with the Department of State Health Services, the Department of Aging and Disability Services, the Governor's

Committee on Persons with Disabilities, other appropriate state agencies, local governments, and appropriate stakeholder groups to develop criteria for evacuation plans for all special needs facilities, to include both licensed and unlicensed facilities.

The Governor's Division of Emergency Management shall ensure local jurisdictions and Regional Unified Command Structures approve evacuation plans maintained by special needs facilities.

The Governor's Division of Emergency Management shall develop and implement a statewide database to assist in the evacuation of the special needs population, with coastal jurisdictions as a priority. RUCS shall be responsible for collecting and providing information for the statewide database.

The Governor's Division of Emergency Management shall develop and implement a plan to address the evacuation and sheltering needs of individuals with companion animals.

**4. Fuel availability and distribution.** To improve fuel availability and distribution during a mass evacuation, I do hereby direct the Texas Department of Transportation to coordinate with the Texas Oil and Gas Association and other industry partners to develop a plan to address fuel availability along major evacuation routes and establish a fuel operations function in the State Operations Center to coordinate the distribution of fuel prior to and during evacuations.

The Governor's Division of Emergency Management shall work with local officials to ensure locally developed evacuation plans address fuel availability during an evacuation.

The Governor's Division of Emergency Management shall establish procedures to distribute fuel in a prioritized manner during an emergency.

The Governor's Division of Emergency Management shall develop policies and procedures to reimburse local governments and other support entities for evacuation-related fuel costs in the event that the Texas Legislature or United States Congress designates funding for this purpose.

**5. Traffic control and management.** To improve traffic control and management during a mass evacuation, I do hereby direct the Texas Department of Public Safety to assume traffic management authority over designated evacuation routes during multi-jurisdictional evacuations in order to move large populations and heavy traffic in a highly-coordinated manner.

The Texas Department of Transportation shall coordinate with the Texas Department of Public Safety to develop contra-flow plans for major hurricane evacuation routes as identified by the Task Force on Evacuation, Transportation and Logistics.

The Texas Department of Transportation shall implement short and long-term solutions to reduce congestion on the one-lane section of U.S. Highway 290 at Brenham, Texas, during an evacuation.

The Texas Department of Transportation shall prioritize for implementation the infrastructure projects recommended in the March 2005 Report to the Governor on Texas Hurricane Preparedness, which address obstructions on evacuation routes during mass evacuations.

The Texas Department of Public Safety shall coordinate with the Department of Homeland Security and the United States Customs and Border Patrol to expedite the flow of traffic through checkpoints on major hurricane evacuation routes and assist in developing traffic management plans to accommodate increased volume at checkpoints during evacuations.

**6. Public awareness.** To increase public awareness, I do hereby direct the Public Utility Commission to work with utility companies that are regulated by the Commission and serve counties in hurricane evacuation zones to include hurricane preparedness and evacuation-related public awareness information in monthly billing statements prior to and during the hurricane season each year.

This executive order supersedes all previous orders in conflict or inconsistent with its terms and shall remain in effect and in full force until it expires by statute or it is modified, amended, rescinded, or superseded by me or by a succeeding governor.

Given under my hand this the 21st day of March, 2006.

**RICK PERRY(Signature)**

Governor

Attested by:

**ROGER WILLIAMS(Signature)**

Secretary of State

## Appendix H: Coordination and Command for Mass Evacuations

In Homeland Security Presidential Directive-5 (HSPD-5), President Bush called on the Secretary of Homeland Security to develop a national incident management system to provide a consistent nationwide approach for Federal, State, tribal and local governments to work together to prepare for, prevent, respond to and recover from domestic incidents, regardless of cause, size or complexity. On March 1, 2004, after close collaboration with State and local government officials and representatives from a wide range of public safety organizations, Homeland Security issued the National Incident Management System (NIMS), which incorporates many existing best practices into a comprehensive national approach to domestic incident management, applicable at all jurisdictional levels and across all functional disciplines.

The NIMS represents a core set of doctrine, principles, terminology, and organizational processes to enable effective, efficient and collaborative incident management at all levels. To provide the framework for interoperability and compatibility, the NIMS is based on a balance between flexibility and standardization. One of the most important practices that has been incorporated into the NIMS is the Incident Command System (ICS), a standard, on-scene, all-hazards incident management system already in use by firefighters, hazardous materials teams, rescuers, and emergency medical teams. The ICS has been established by the NIMS as the standardized incident organizational structure for the management of all incidents.

NIMS standard incident command structures are based on the following three key organizational systems:

1. **Multiagency Coordination Systems:** These define the operating characteristics, interactive management components, and organizational structure of supporting incident management entities engaged at the Federal, State, local, tribal, and regional levels through mutual-aid agreements and other assistance arrangements.
2. **ICS:** The ICS defines the operating characteristics, interactive management components, and structure of incident management and emergency response organizations engaged throughout the life cycle of an incident.
3. **Public Information Systems:** These refer to processes, procedures, and systems for communicating timely and accurate information to the public during crisis or emergency situations.

In a letter written in October 2005, Homeland Security Secretary Michael Chertoff told the Governors that Hurricane Katrina was a stark reminder of how critical it is for our nation to approach incident management in a coordinated, consistent, and efficient manner. Secretary Chertoff emphasized that all levels of government need to work together to prevent, prepare for, respond to, and recover from any emergency or disaster.

To better understand how ICS and NIMS relate to catastrophic evacuations, this appendix provides a description of the major components of the command structure for Federal, State, and local governments as discussed in Chapter II of this report.

HSPD-5 designates the Secretary of Homeland Security as the “principal Federal official” (PFO) for domestic incident management.”<sup>75</sup> The U.S. DOT plays support or leadership roles in many areas of emergency management, including Emergency Support Function (ESF) 1, Transportation, under the NRP. No incident, whether an evacuation is involved or not, can be successfully prepared for or recovered from without the movement of people and goods using our nation’s transportation systems. In addition to the roles defined in the NRP, such as providing emergency exemptions on the transport of hazardous materials like fuel, the U.S. DOT also assists with preparation by supporting the development of intelligent transportation systems, and developing guidance for transportation professionals on emergency management. These roles are outlined in detail later in this appendix.

## **Multiagency Coordination Entity**

This entity functions within a broader multiagency coordination system. It may establish priorities among incidents and associated resource allocations, de-conflict agency policies, and provide strategic guidance and direction to support incident management activities.<sup>76</sup>

### **Interagency Incident Management Group (IIMG)**

The IIMG is a Federal headquarters-level multiagency coordination entity that facilitates strategic Federal domestic incident management for Incidents of National Significance. The Secretary of Homeland Security activates the IIMG based on the nature, severity, magnitude, and complexity of the threat or incident. The Secretary of Homeland Security may activate the IIMG for high-profile, large-scale events that present high-probability targets, such as National Special Security Events (NSSEs), and in heightened threat situations. The IIMG is comprised of senior representatives from DHS components, other Federal departments and agencies, and NGOs, as required.<sup>77</sup>

### **Joint Field Office (JFO) Coordination Group**

Utilizing the NIMS principle of Unified Command, JFO activities are directed by a JFO Coordination Group, which may include the PFO, Senior Federal Law Enforcement Official (SFLEO), Federal Coordinating Officer (FCO)/Federal Resource Coordinator (FRC), or other SFOs with primary jurisdictional responsibility or functional authority for the incident.

The JFO Coordination Group also includes a limited number of principal State, local, and tribal officials (such as the State Coordinating Officer or SCO), as well as NGO and private-sector representatives. The JFO Coordination Group functions as a multiagency coordination entity and works jointly to establish priorities (single or multiple incidents) and associated resource allocation, resolve agency policy issues, and provide strategic guidance to support Federal incident management activities. Generally, the PFO, in consultation with the FCO and SFLEO, determines the composition of the JFO Coordination Group.<sup>78</sup>

**PFO:** The PFO is the local representative of the Secretary of DHS, appointed to oversee, coordinate, and execute the Federal government's incident management responsibilities for Incidents of National Significance. Moreover, the PFO addresses long-term care and treatment of affected persons, implements additional measures for community restoration, incorporates mitigation measures and techniques as feasible, evaluates the incident to identify lessons learned, and develops initiatives to mitigate the effects of future incidents. Depending on the magnitude of the disaster, however, a PFO may not always be designated, in which case the FCO will provide the Federal lead.<sup>79</sup>

**SFLEO:** The SFLEO is the senior law enforcement official from the agency with primary jurisdictional responsibility as directed by statute, Presidential directive, existing Federal policies, and/or the Attorney General. The SFLEO directs intelligence and investigative law enforcement operations related to the incident and supports the law enforcement component of the Unified Command on scene. In the event of a terrorist incident, this official will normally be the FBI Special Agent in Charge (SAC).<sup>80</sup>

**FCO:** The FCO manages and coordinates Federal resource support activities related to Stafford Act disasters and emergencies. The FCO is responsible for coordinating the timely delivery of Federal disaster assistance resources and programs to the affected State and local governments, individual victims, and the private sector. The FCO assists the Unified Command and/or the Area Command, and works closely with the PFO, SFLEO, and other SFOs. In Stafford Act situations where a PFO has not been assigned, the FCO provides overall coordination for the Federal components of the JFO.<sup>81</sup>

**FRC:** In non-Stafford Act situations when a Federal department or agency acting under its own authority has requested the assistance of the Secretary of Homeland Security to obtain support from other Federal departments and agencies, DHS designates an FRC. In these situations, the FRC coordinates support through interagency agreements and MOUs. Relying on the same skill set, DHS may select the FRC from the FCO cadre or other personnel with equivalent knowledge, skills, and abilities. The FRC is responsible for coordinating the timely delivery of resources to the requesting agency.<sup>82</sup>

**SCO:** The SCO represents the State, and is appointed to manage State resource support activities related to disasters and emergencies. The SCO is the State's principal point-of-contact with the Federal Government. Additionally, the SCO is responsible for coordinating the timely delivery of State disaster assistance resources and programs to the affected local governments, individual victims, and the private sector. The SCO works with the FCO to identify emergency response requirements for the State.<sup>83</sup>

## Multiagency Coordination Centers

Multiagency coordination centers and emergency operations centers (EOCs) provide central locations for operational information-sharing and resource coordination in support of on-scene efforts.<sup>84</sup>

### **Homeland Security Operations Center (HSOC)**

The HSOC is the primary national hub for domestic incident management operational coordination and situational awareness. The HSOC is a standing 24/7 interagency organization fusing law enforcement, national intelligence, emergency response, and private sector reporting. The HSOC facilitates homeland security information-sharing and operational coordination with other Federal, State, local, tribal, and nongovernmental EOCs.<sup>85</sup>

### **National Response Coordination Center (NRCC)**

The NRCC is a multiagency center that provides overall Federal response coordination for Incidents of National Significance, including coordinating the use of Federal remote sensing and disaster assessment support, and emergency management program implementation. During an incident, the NRCC operates on a 24/7 basis or as required in coordination with other elements of the HSOC. To support incident operations, more than 40 departments and agencies from activated ESF primary and support agencies provide representatives to augment the NRCC. Moreover, FEMA maintains the NRCC as a functional component of the HSOC in support of incident management operations. The NRCC monitors potential or developing Incidents of National Significance and supports the efforts of regional and field components. If required, the NRCC will activate and deploy national-level entities such as the National Disaster Medical System, Urban Search and Rescue Task Forces, Mobile Emergency Response Support, and Emergency Response Team (ERT).<sup>86</sup>

### **Regional Response Coordination Center (RRCC)**

The RRCC is a standing facility operated by FEMA that is activated to coordinate regional response efforts, establish Federal priorities, and implement local Federal program support until a JFO is established in the field and/or the PFO, FCO, or FRC can assume their National Response Plan coordination responsibilities. The RRCC establishes communications with the affected State emergency management agency and the NRCC, and coordinates deployment of the Emergency Response Team–Advance Element (ERT-A) to field locations. Moreover, the RRCC assesses damage information, develops situation reports, and issues initial mission assignments.<sup>87</sup>

### **JFO**

The JFO is a multiagency coordination center established locally. It provides a central location for coordination of Federal, State, local, tribal, nongovernmental, and private sector organizations with primary responsibility for threat response and incident support. The JFO enables the effective and efficient coordination of Federal incident-related prevention, preparedness, response, and recovery actions. The JFO organization adapts to the magnitude and complexity of the situation at hand, and incorporates the NIMS principles regarding span of control and organizational structure including management, operations, planning, logistics, and finance and administration. Although the JFO uses an ICS structure, it does not manage on-scene operations. Instead, the JFO focuses on providing support to on-scene efforts and conducts broader support operations that may extend beyond the incident site.<sup>88</sup>

## State (and Local) EOCs

The State EOC is a physical location at which the coordination of information and resources to support state incident management activities normally takes place. The State EOC may be a temporary facility or may be located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction. Moreover, it may be organized by major functional disciplines (e.g., fire, law enforcement, and medical services). When advance warning of potential disaster or emergencies is possible, DHS through its HSOC may deploy and request other Federal agencies to deploy liaison officers and personnel to the State EOC to assess the emerging situation. During an emergency, the State Governor will activate the State EOC.<sup>89</sup>

## Incident Command

As noted in the introduction, ICS is a standard, on-scene, all-hazards incident management system already in use by the Federal, State, local first responder community.

### Area Command (Unified Area Command Structure)

An Area Command is established to oversee the management of multiple incidents that are each being handled by a separate ICS organization or to oversee the management of a very large or complex incident that has multiple incident management teams engaged. An Area Command Structure becomes a Unified Area Command Structure when incidents are multi-jurisdictional. Agencies work together through the designated members of the Unified Command to establish their designated Incident Commanders at a single Incident Command Post (ICP) and to establish a common set of objectives and strategies and a single Incident Action Plan. The organization has the responsibility to set overall strategy and priorities, allocate critical resources according to priorities, ensure that incidents are properly managed, and ensure that objectives are met and strategies followed.<sup>90</sup>

### ICP

This is the field location at which the primary tactical-level, on-scene incident command functions are performed. The ICP may be collocated with the incident base or other incident facilities and is normally identified by a green rotating or flashing light.<sup>91</sup>

## Other Coordination Entities

### Federal

- **Defense Support of Civil Authorities (DSCA):** DSCA refers to Department of Defense (DOD) support provided by Federal military forces, DOD civilians and contract personnel, and DOD agencies and components in response to requests for assistance during domestic incidents to include terrorist threats or attacks, major disasters, and other emergencies including mass evacuations.<sup>92</sup>
- **Emergency Support Functions (ESFs):** The ESFs serve as the coordination mechanism to provide assistance to State, local, and tribal governments or to Federal departments and

agencies conducting missions of primary Federal responsibility. ESFs are activated by the NRCC or the RRCC and liaisons for each ESF receive mission assignment through the JFO. Overall, there are 15 ESFs identified in the NRP, including the following ESFs primarily involved in a mass evacuation event: Transportation (ESF-1), Emergency Management (ESF-5), Mass Care, Housing and Human Service (ESF-6), Resources Support (ESF-7), Public Health and Medical Services (ESF-8), Agriculture and Natural Resources (ESF-11), Public Safety and Security (ESF-13), and External Affairs (ESF-15).<sup>93</sup>

- **ESF Coordinator:** The ESF Coordinator has ongoing responsibilities throughout the prevention, preparedness, response, recovery, and mitigation phases of incident management. The role of the ESF coordinator is carried out through a unified command approach as agreed upon collectively by the designated primary agencies. The responsibilities of the ESF coordinator include pre-incident planning and coordination, maintaining ongoing contact with ESF primary and support agencies, conducting periodic ESF meetings and conference calls, coordinating efforts with corresponding private-sector organizations, and coordinating ESF activities relating to catastrophic incident planning and critical infrastructure preparedness as appropriate.<sup>94</sup>

### **U.S. DOT's Emergency Management Support Functions and Capabilities**

- **ESF-1:** Responsibilities are to assist Federal, State, and local agencies; tribal governmental entities; and voluntary organizations requiring transportation for incidents requiring Federal coordination. Activities within the scope of ESF-1 functions include processing and coordinating requests for Federal and civil transportation support as directed under NRP; reporting damage to transportation infrastructure as a result of the incident; coordinating alternate transportation services; coordinating the restoration and recovery of the transportation infrastructure; performing activities conducted under the direct authority of U.S. DOT elements such as air, maritime, surface, rail, and pipelines; and coordinating and supporting prevention, preparedness, and mitigation among transportation infrastructure stakeholders at the State and local levels.<sup>95</sup> Within DOT, the Department's Emergency Response Team is the coordinating organization for emergency response to meet both the statutory and ESF-1 responsibilities of the Department.
- **U.S. DOT Office of Intelligence, Security, and Emergency Response (S-60):** S-60 serves as U.S. DOT's focal point for leadership and direction on intelligence and emergency management matters, and executes the Secretary's delegated statutory and administrative authorities for U.S. DOT emergency management. S-60 is the catalyst for all Departmental emergency management efforts, and is responsible for affecting the Secretary's statutory responsibilities for transportation emergency management nationwide. As U.S. DOT's leading office on transportation emergency management, S-60 directs the Department's overall prevention, preparedness, response, and recovery efforts. These key duties include providing support for the Department's Emergency Response Team; providing transportation threat notifications; directing the intra- and inter-agency emergency coordination efforts at the regional level; developing and maintaining U.S. DOT's emergency management strategy, policies, and plans; and operating the DOT Crisis Management Center (CMC).
- **Crisis Management Center:** The CMC serves as the central information communications center for the U.S. DOT. The CMC information systems, facilities, and staff collect, receive,

analyze, synthesize, develop, and distribute transportation information. On a routine basis, the CMC serves as the Department's central information center for the dissemination and interchange of information among operating administration senior staff, emergency support staff, other Federal agencies, foreign transportation authorities, State and local government agencies, and the transportation industry. The CMC operations include provisions for developing lines of communications and promoting information interchange with transportation industry partners.

- **Modal Emergency Coordinators (ECs):** The U.S. DOT modal ECs serve as the primary emergency points of contact for all U.S. DOT operating administrations. In addition, Headquarters ECs may have regional or division-level ECs assigned throughout the United States. During a disaster or other emergency event, ECs report to the CMC on the status of the transportation infrastructure specific to their mode, and work with their mode to support restoration and recovery of the transportation infrastructure as necessary. ECs provide modal subject matter expertise to ESF-1 as requested. For example, the FHWA Modal EC interacts with State DOTs in requesting waivers of size and weight regulations facilitating movement of disaster relief goods, personnel, and services.
- **Regional Emergency Surge Staff** – The DOT Regional Emergency Transportation Coordinators and Representatives (RETCO/RETREP) provide full time, collateral duty and volunteer DOT staff to augment the below entities, when established. Their role is to provide direct support to the ESF-1 mission. ESF-1 Staff, including support agencies, are provided to the following organizations:
  - Regional Response Coordination Center (RRCC): A regional component, the RRCC, may be established temporarily until the larger, more comprehensive Joint Field Office is established and functional.
  - Joint Field Office (JFO): Multiple Joint Field Offices may be established in support of an incident, for both regional-level and nationwide incidents. Note that, under certain circumstances, the Secretary will deploy a representative to one or more JFOs to serve as a Senior Federal Official in support of the Principal Federal Official under the National Response Plan.
  - State Emergency Operations Centers.
  - Local Emergency Operations Centers.
  - Local Incident Command.
  - Mobilization Centers
  - Logistics Staging Areas
  - Local Points of Distribution (normally staffed by state and local personnel)
- **Evacuation Liaison Team (ELT):** The primary role of the ELT, led by U.S. DOT in Region IV with support from FEMA Region IV, is to provide Federal, State, and local emergency management, highway patrol and law enforcement, public safety, and transportation officials with timely and accurate traffic and evacuation-related information during multi-State hurricane threats. The ELT supports regional hurricane response efforts by compiling, analyzing, and disseminating traffic-related information that can be used to facilitate the rapid, efficient, and safe evacuation of threatened populations.<sup>96</sup>

## State and Local

- **Governor:** The Governor of the impacted State is the chief executive of the State and is responsible for the safety and welfare of its people. The Governor coordinates the state's assets and resources to prevent, prepare for, respond to, and recover from emergency situations. The Governor is the Commander-in-Chief of State military forces (i.e., National Guard when in State Active Duty or Title 32, United States Code Status and the authorized state militias) and in certain emergency conditions, the Governor has police powers to make, amend, and rescind orders and regulations.<sup>97</sup>
- **Local Chief Executive Officer (CEO):** A mayor or city or county manager, as a local jurisdiction's CEO, is responsible for the public safety and welfare of the people of that jurisdiction. The Local CEO is responsible for coordinating local resources to address the full spectrum of actions to prevent, prepare for, respond to, and recover from emergencies. Depending upon State and local law, the Local CEO has extraordinary powers to suspend local laws and ordinances, and may establish a curfew, direct evacuations, and, in coordination with the local health authority, order quarantine. The Local CEO negotiates and enters into mutual-aid agreements with other jurisdictions to facilitate resource-sharing. When the local jurisdiction's capabilities have been exceeded or exhausted, the Local CEO may request State and, if necessary, Federal assistance through the Governor.<sup>98</sup>
- **Tribal CEO:** The leader of a tribe is responsible for the public safety and welfare of the people within that tribe. As authorized by tribal government, the Tribal CEO is responsible for coordinating tribal resources to address the full spectrum of actions to prevent, prepare for, respond to, and recover from incidents involving all hazards including terrorism, natural disasters, accidents, and other contingencies. The Tribal CEO has extraordinary powers to suspend tribal laws and ordinances, such as to establish a curfew, direct evacuations, and order quarantine. Furthermore, the Tribal CEO can request State and Federal assistance through the Governor of the State when the tribe's capabilities have been exceeded or exhausted. Also, this individual can elect to deal directly with the Federal Government. (Although a State Governor must request a Presidential disaster declaration on behalf of a tribe under the Stafford Act, Federal agencies can work directly with the tribe within existing authorities and resources.)<sup>99</sup>
- **State Emergency Management Agency:** A state emergency management agency is designated by the governor to plan, prepare for, and support the state's response to a variety of emergencies and hazards. The agency creates emergency operations plans for the state to support emergency management functions and prepares state contingency plans designed to prevent, prepare for, respond to, and recover from all hazards. All state plans are to be coordinated and in sync with local, tribal, and regional emergency management activities.<sup>100</sup>
- **Law Enforcement Agencies (State):** Each State has jurisdiction for enforcement of State law, using State and local resources, including the National Guard (to the extent that the National Guard remains under State authority and has not been called into Federal service or ordered to active duty). The local and State law enforcement agencies within an affected area, among other responsibilities, enforce law and order during a mass evacuation.<sup>101</sup>

## **Appendix I: U.S. DOT Evacuation-Related Responsibilities**

### **Federal Aviation Administration (FAA)**

The FAA is responsible for operating the National Airspace System (NAS), including the provision of air navigation services such as air traffic control; regulatory oversight of traffic in the NAS and U.S. air operators; national planning, development, and regulation of airports; and the control and management of the country's airspace.

Reflecting its core responsibilities, authorities, and capabilities, the FAA plays a very active role in responding to national disasters, including support of air evacuations. These activities focus primarily on two aspects of the response effort. First, the agency provides substantial aviation expertise and operational support through the U.S. DOT ESF-1 function at the national, regional, and local levels as needed. This support includes airspace measures such as establishing and managing Temporary Flight Restrictions (TFR) over disaster areas, enabling evacuation and other relief aircraft to carry out their missions more safely, flexibly, and rapidly. The FAA also operationally coordinates with Federal partners such as DHS and DOD; State and local authorities; and private sector entities to support evacuation efforts. In addition, the agency can take needed regulatory steps such as revising air crew rest requirements for operators conducting critical relief missions as long as safety is maintained.

Second, the FAA quickly restores air navigation services and associated NAS facilities and systems, which may be damaged or otherwise disrupted in the disaster area. This effort is coordinated with DHS, DOD, and other key stakeholders at the Federal, State, and local levels, as well with the private sector, to ensure that services needed for evacuation flights and other relief missions are given priority.

The FAA has established a number of operational cells, which directly support evacuation and other operational disaster response efforts involving the NAS. Some of these specialized cells are activated at FAA facilities, including the Hurricane Recovery Desk at the agency's Air Traffic Control System Command Center and the Hurricane Operations Cell at FAA Headquarters. Both cells coordinate air operations with the NRCC, DOD operational elements, and other entities and were stood up for Hurricanes Katrina, Rita, and Wilma in 2005. Other elements of the FAA's response capabilities are integrated with ESF-1 elements established by FEMA at the national, regional, and local levels.

### *FAA and Aviation Industry Response to Hurricanes Katrina and Rita*

The FAA worked closely with the DHS (including FEMA and TSA), DOD, and other Federal, State, and local partners, as well as private sector air operators to quickly restore air transportation to the Gulf Coast region needed to support the post-landfall evacuation of the New Orleans area. Under the extremely difficult conditions after Hurricane Katrina, the FAA was able to quickly restore critical air navigation services in the damaged areas, giving priority to airports (e.g., Louis Armstrong New Orleans International Airport) and services need to support

evacuation flights and other critical relief missions. The agency, in coordination with its partners, also rapidly implemented airspace and other air traffic operations measures, including a set of TFRs over the disaster areas along the Gulf Coast, to facilitate relief air operations; a process for vetting relief aircraft run by the Hurricane Recovery Desk and Hurricane Operations Cell mentioned above; and air operation coordination links to the NRCC, DOD operational units, and other key players. In addition, the FAA temporarily eased regulatory restrictions on the maximum flight hours for crews involved in the air evacuations to assist carriers in their scheduling requirements.

At Louis Armstrong New Orleans International Airport, the tower was quickly restored and mobile generators, satellite communications, radios and temporary lighting were deployed and installed to support the the largest airlift on United States soil. To expedite the reopening of the airport, several volunteer controllers and technicians rode out the storm at the tower. Recovery efforts were coordinated with other FAA facilities and airports outside of the disaster area to provide technicians, infrastructure experts, and ground and fire fighting personnel to assess damage, assist with immediate repairs, and support operations. This rapid work was accomplished in cooperation with DHS, DOD, State, and local personnel.

In less than one week, almost full air traffic control and navigational aid capability was restored to the New Orleans airport. Within the first week, 400 civilian and military aircraft safely evacuated over 24,000 people, and delivered relief supplies. Louis Armstrong New Orleans International Airport became one of the nation's busiest airports as personnel handled 3,300 flights per day, quadruple normal air traffic levels, with an arrival rate of 15 aircraft per hour and up to 150 helicopter operations. FAA personnel worked to staff air traffic control facilities, repair navigational aids and other critical infrastructure, and to provide safety oversight in support of ongoing evacuation and relief efforts.<sup>102</sup>

Before Hurricane Rita made landfall, FAA air traffic control facilities in Houston and Beaumont-Port Arthur helped FEMA evacuation flights carry several thousand people to other cities in Texas and Arkansas. Early Friday morning, September 23, air traffic controllers from San Antonio relieved co-workers who had continued to work as the area was evacuated at the Beaumont-Port Arthur Air Traffic Control Tower to help the military evacuate citizens. The FAA's controllers helped the military airlift 4,000 people out of danger, many of them sick and elderly.

The aviation industry's "Operation AIR CARE" provided emergency airlift support to more than 24,000 New Orleans residents. The Air Transport Association (ATA), a trade group for the major airline carriers, worked with the ESF-1 program, FAA, and FEMA to provide evacuation and relief services. U.S. and foreign commercial carriers and military aircraft also provided substantial resources.

Air carriers initiated volunteer activities and ATA helped to manage the airlifts. Participating passenger carriers included Alaska, America West, American, ATA, Continental, Delta, Jet Blue, Northwest, Southwest, United, US Airways, and Air Canada. Cargo carriers also provided support, including ASTAR Air Cargo, Federal Express and UPS Airlines. FEMA also asked

Angel Flight America, which provides regularly flights in private planes for patients and families, to participate in the evacuation efforts, particularly for those with special needs.

## **Federal Highway Administration (FHWA)**

Through its Federal-aid programs, FHWA provides financial and technical support to the States and local governments for constructing, improving, preserving, and operating the highway system. Highways are generally owned and operated by State and local jurisdictions that are responsible for planning and implementing highway evacuations. While FHWA does not have regulatory authority to direct movement on highways, in a catastrophic event where Federal agencies are working with State authorities, the FHWA may provide technical support to State officials for highway evacuation operations.

Several FHWA funding programs include evacuation-related activities as eligible expenses, including National Highway System Program, Surface Transportation Program, Equity Bonus, Metropolitan Planning Funds, and State Planning and Research. Examples of the types of evacuation activities that State and local transportation agencies could pursue with FHWA funding include evacuation planning and coordination, contraflow planning, and deployment of traffic monitoring systems such as traffic counters and surveillance cameras along the evacuation routes, and traveler information systems.

FHWA has a number of initiatives to support evacuation planning and implementation including sharing best practices, providing training and technical assistance, and conducting research and development to improve evacuation capabilities. Currently, as already discussed, the FHWA is developing a series of primers to assist State and local emergency response and transportation agencies in planning for evacuations. These primers will be widely distributed and will also serve as training material for a series of regional workshops.

FHWA Division Offices are located in each State, Washington, DC, and Puerto Rico. In New York City, Chicago, Los Angeles, and Philadelphia, FHWA maintains metropolitan offices. There is also an FHWA Resource Center with locations in Baltimore, Atlanta, Olympia Fields, Illinois, Lakewood Colorado, and San Francisco. Each of these offices has collateral duty personnel designated as Emergency Coordinators (EC) and Alternate Emergency Coordinators. The mission of these ECs is to coordinate organizational efforts to prepare for, respond to, and recover from any emergency or situation that may disrupt normal operations; support the RETCO/RETREP program and ESF-1 function as requested; and serve as the organization focal point for executing FHWA emergency notification and reporting procedures and for responding to requests for situational awareness information regarding the status and capabilities of the NHS, STRAHNET, and other arterials. In addition to these duties, the scope of FHWA field office activities vary depending on the needs of the State. For example, in Florida the FHWA EC coordinates with the Florida Department of Transportation to update statewide contraflow evacuation plans and implement the emergency transportation information system. In Mississippi the FHWA EC participates in hurricane planning activities. The Team Leader for the Evacuation Liaison Team described on page 2-19 is from the Atlanta Resource Center. Field offices also provide representatives as needed to fill a variety of positions in the ESF-1 function and within the federal response command and control framework.<sup>103</sup>

As an adjunct to the Federal-Aid Highway Program, the FHWA administers the Federal Lands Highway Program in cooperation with Federal land managing agencies including the National Park Service, Forest Service, Military Surface Deployment and Distribution Command, Fish and Wildlife Service, and the Bureau of Indian Affairs. The Federal lands-program provides funding for more than 90,000 miles of federally owned and public authority-owned roads serving Federal lands, including forest highway system roads, parkways and park roads, Indian reservation roads, defense access roads, and other Federal lands roads. The Federal Lands Highway Office of the FHWA provides direct program coordination, administration and design and construction engineering assistance, and directs the conduct of transportation planning and engineering studies for Federal lands projects.

### *FHWA Response to Hurricanes Katrina and Rita*

FHWA staff at headquarters and from division, metropolitan, and resource center offices provided personnel support at ESF-1 and other offices throughout the response network. The FHWA EC in each effected state provided vital, timely highway infrastructure situational awareness information. FHWA provided members to the Secretary of Transportation Emergency Response Team (ERT) operations section based in the CMC. These individuals were responsible for obtaining information from the EC network and other sources and for developing the readiness and capability of the regional transportation infrastructure used to provide routing information to facilitate the post-landfall evacuation of New Orleans and the movement of relief supplies into the region. The ELT, described on page 2-19, facilitated pre-landfall evacuation and contraflow operations throughout the region and supported the post-landfall evacuation operations in New Orleans post-landfall, a mission not previously assigned to that team. Using its Emergency Relief Program funding authority, FHWA provided debris removal and emergency repair funding. FHWA subject matter experts from headquarters and Division Offices provided technical assistance and subject matter expertise to State DOTs to facilitate the speedy design of temporary repairs.

### **ITS Joint Program Office (JPO)**

The ITS JPO supports the development of advanced technologies to improve the safety and efficiency of transportation systems. A major initiative addressing emergency transportation operations is now being revised to better focus on the development and application of ITS technologies to improve evacuation planning, monitoring, and implementation. It is expected that the revised initiative will improve the information available to travelers as well as decision-makers engaged in evacuations.

### **Federal Transit Administration (FTA)**

In SAFETEA-LU, Congress increased FTA's role in evacuations. Previously, FTA did not have authority to regulate the operation, routes, schedules, rates, fares, tolls, rentals, or other charges of FTA grantees. The new authorizing legislation created an exception to give FTA authority to regulate transit operations when needed for national defense or in the event of a national or regional emergency.<sup>104</sup> SAFETEA-LU also expanded the definition of capital expenditures eligible for FTA funding to include, among other things, security projects such as emergency

response planning, exercises, and training. SAFETEA-LU also called for a *Public Transportation National Security Study* by the TRB under an agreement with the U.S. DOT. The study is to evaluate the ability of 38 major transit systems to accommodate evacuations from critical locations in times of emergency.<sup>105</sup> The study is planned to begin in the summer of 2006.

Following Hurricanes Katrina and Rita, FTA instituted a number of initiatives to help improve the use of transit in evacuations. In September 2005, FTA posted “Hurricane Katrina Information for FTA Grantees” on its internal Web site available to its grantees. This information package provided guidance on FTA funding and regulations affecting hurricane response and recovery. While most of the guidance related to recovery from the hurricane and restoring service, it also provided a basis for transit agencies to plan their roles in future evacuations. For example, the guidance allows FTA grantees to loan transit vehicles to other transit agencies without obtaining an FTA determination ahead of time. In response to hurricane Katrina, FTA also waived the charter bus rule to allow transit agencies to provide buses for evacuation assistance. Under normal operations, FTA’s charter bus rule, found in the Code of Federal Regulations (49CFR604), prohibits transit agencies from providing bus service that could be provided by a private charter bus operator.

On November 30, 2005, FTA issued a *Federal Register* Notice to provide funding levels and guidance from SAFETEA-LU for its 2006 program. This notice includes emergency management as one of its five primary emphasis areas for 2006 and allows States and metropolitan planning organizations to use FTA planning funds to support evacuation planning. The *Federal Register* Notice states:

A high-profile theme that spans both security and safety is disaster planning. In particular, areas that are vulnerable to disasters of either man-made or natural origin are encouraged to consider including disaster planning work activities into their [required plans]. Examples of planning-related disaster planning activities include all stages of emergency preparedness planning—ranging from preparing multimodal evacuation plans before a possible event, to strategies for bringing emergency supplies and relief aid to affected areas after the event.<sup>106</sup>

FTA included a specific goal in its 2006 Strategic Business Plan to develop an FTA Disaster Response and Recovery Plan to improve its role and effectiveness in emergency response, including evacuations. The goal states:

Based on lessons learned from Hurricane Katrina and other events, develop a Disaster Response and Recovery Plan that will include standard operating procedures, staffing and resource plan, updated administrative and procurement procedures including emergency contracts for consultants’ with pre-existing scopes of work, guidance for transit agencies for working with State and local disaster preparedness efforts and understanding FEMA policies and procedures for emergency public transportation assistance and funding, and a legislative strategy for FTA emergency authority and funding.”

The plan is under development and is scheduled to be completed in September 2006.

FTA's United We Ride program is working to improve the coordination and operations of paratransit service among human services and transportation agencies. This will improve transportation services for people with disabilities, older adults, and individuals with low incomes who do not have access to a personal vehicle, may not be able to access fixed route services, and also may require additional transportation support. Following Hurricanes Katrina and Rita, the FTA began new initiatives under this program to help identify and organize paratransit resources to help in mass evacuations.

FTA's "The Public Transportation System Security and Emergency Preparedness Planning Guide,"<sup>107</sup> provides information for transit agencies on comprehensive security and emergency preparedness planning, including evacuations. Transit agencies develop safety and security plans, and the FTA reviews their plans during periodic oversight reviews. In the 2006 guidance for these oversight reviews, FTA added two questions to increase its focus on evacuations: "Has the grantee reviewed and updated as needed its emergency management plan in light of Hurricane Katrina?" and "Are there procedures in the emergency management plan that detail how the transit agency would assist in a large-scale evacuation effort?"<sup>108</sup>

These new programs are in addition to existing emergency preparedness initiatives that include components to help support the effective participation of transit agencies in mass evacuation planning and implementation. For example, FTA conducts two-day forums in major metropolitan areas called "Connecting Communities" to promote coordination among transit agencies and emergency management agencies throughout metropolitan areas. One of the goals of the forums is to integrate transit and transportation systems as a resource in regional emergencies such as evacuations. FTA also offers a training course to transit agencies and emergency responders, "Effectively Managing Transit Emergencies." This course provides training on establishing an emergency management plan and ICS, which are important tools in evacuation planning and implementation.

### *FTA and Transit Industry Response to Hurricanes Katrina and Rita*

During the evacuations and response to Hurricanes Katrina and Rita, FTA staff was deployed to the CMC to provide support for ESF-1 functions. FTA also worked in partnership with APTA to identify buses, mechanics, and drivers from transit agencies across the country that volunteered to help with the evacuation. FTA coordinated the deployment of these resources with the ESF-1 program. APTA worked with FTA to determine how support from the transit industry could be provided and served as an industry liaison to the federal government. Since Hurricane Katrina, APTA has formed the APTA Emergency Preparedness Task Force to develop strategies to improve the working relationship and coordination with the governments at all levels in emergency response.

The transit agencies sending equipment to assist with the evacuation after Hurricane Katrina included:

- The New York Metropolitan Transportation Authority (MTA) provided 100 buses and 200 volunteer bus operators as well as maintenance staff. The MTA also transported 150 volunteer officers from the New York Police Department to the Gulf Coast region.

- New Jersey Transit Corporation sent four buses to transport New Jersey and local police officers to the affected region.
- The Washington Metropolitan Area Transit Authority procured 10 charter buses to drive to New Orleans, pick up evacuees, and bring them back to Washington, DC.
- The Port Authority of New York and New Jersey sent three 2-person teams to the affected area.
- MV Transportation Inc. sent 52 buses and lift vans, along with drivers and mechanics, to assist in the specialized evacuation of the elderly, persons with disabilities, and hospital patients from New Orleans. The vehicles came from as far away as San Francisco, Chicago, and Orlando.

In Texas, the Fort Worth Transportation Authority, Dallas Area Rapid Transit in Dallas, and Capital Metropolitan Transportation Authority in Austin, transported hundreds of hurricane survivors who arrived at airport, rail stations, and motor coach terminals to shelters and to hospitals for medical treatment. Transit systems in Little Rock, Arkansas; Cleveland, Ohio; Charlotte, North Carolina; Washington, DC; Providence, Rhode Island; Salt Lake City, Utah; Tucson, Arizona; and Atlanta, Georgia, also met hundreds of evacuees at their airports and transported them to shelters.

### **Federal Railroad Administration (FRA)**

FRA monitors the safety of railroads in the U.S. and issues and enforces rail safety regulations. FRA also promotes rail safety and efficiency through railroad assistance programs, research and development, rehabilitation of Northeast Corridor rail passenger service, and consolidation of government support of rail transportation activities. Under its legislative authority, FRA may stop, redirect, or limit rail service, including freight and passenger service and some commuter rail service, to abate unsafe conditions. This authority applies to all railroad service that is connected to the general freight and passenger rail system. This authority does not extend to rail rapid transit systems not part of the general railroad system.<sup>109</sup>

The Surface Transportation Board (STB) is an independent agency created after the Interstate Commerce Commission (ICC) was abolished. The STB serves as both an adjudicatory and a regulatory body and has jurisdiction over railroad rates and service issues and railroad mergers and restructuring. The STB can direct, for a period of 270 days, the movement and prioritization of freight traffic necessary to alleviate an emergency situation involving the failure of traffic movement having substantial adverse impacts on shippers or on rail service in any region of the United States, and may also order that preference be given to certain traffic.<sup>110</sup>

The FRA headquarters and field staff also staff the CMC and FEMA regional emergency operations centers when it is activated for a disaster or elevated threat level. The FRA staff serve as subject matter experts and liaisons between the industry and the government.

### *FRA and Railroad Industry Response to Hurricanes Katrina and Rita*

FRA staffed the CMC and FEMA regional emergency operations centers and worked with Amtrak, commuter trains, and freight railroads. During the critical early days after Hurricane Katrina, FRA held daily conference calls with railroad officials and FEMA and DHS to share information and coordinate relief and recovery efforts.<sup>111</sup> Railroads worked closely through the ESF-1 program and FEMA to assign priorities to the shipments most needed in the stricken areas. An Amtrak train evacuated 96 residents from New Orleans. Trains transported heavy equipment, supplies, and relief equipment such as FEMA supplies, trailers, and other equipment into the area.<sup>112</sup> Difficulty was encountered in staging evacuees to use the passenger rail services that were offered by Amtrak because of communication and coordination problems among local, State, and Federal officials.

The railroad industry, including passenger rail, commuter trains, and freight railroads, were deployed to support emergency response to Hurricanes Katrina and Rita. Trains were used to move some evacuees out of the region and to transport heavy equipment, supplies, and relief equipment into the area.

Trainloads of ballast, ties, and emergency equipment were staged outside of the immediate storm area. Some railroads moved camp cars into place to support maintenance forces that would have to be fed and housed. With advance preparation, the railroads were able to reopen most of their lines within days of the storm, with the exception of those in the immediate New Orleans area.

In the initial preparations for the landfall of Hurricane Katrina, Amtrak offered help but was turned down—so a train with 900 seats (7 locomotives and 20 cars) rolled away empty a day and a half before the storm. After the hurricane, Amtrak provided a special train that operated over freight tracks to evacuate 96 people from New Orleans to Lafayette, Louisiana. These trains also brought in essential supplies of food and water. "We have clear tracks and an empty train ready to help get residents safely out of the city," said Secretary of Transportation Norman Mineta.<sup>113</sup> The special 12-car Amtrak passenger train moved evacuees to Lafayette, where passengers were transferred to motor coaches to complete the journey to Dallas and other destinations.

Railroads were also used to support evacuation for Hurricane Rita. Amtrak, Burlington Northern Santa Fe (BNSF) railway, and Trinity Railway Express coordinated equipment, rail lines, and crew to create a special passenger train to evacuate 450 people from the Houston area to Dallas. The railroad industry worked with State and local emergency responders, the National Guard, and volunteer groups on the evacuation. The Salvation Army, other volunteers, and the National Guard helped provide food, water, and other necessities to the evacuees. The baby food, diapers, and other paper products were especially welcome to the many families traveling with children. When the train arrived at Dallas Union Station, some evacuees were met by representatives of the Salvation Army and other agencies who directed them to shelters; others were met by family members. Those with special medical needs were taken to local health care facilities.<sup>114</sup>

## **Federal Motor Carrier Safety Administration (FMCSA)**

FMCSA oversees the safety of motor carrier operations in interstate commerce. FMCSA regulates operating and maintenance practices, national standards for licensing commercial vehicle drivers, the transportation of hazardous materials, and hours of service, and makes grants to State and local motor carrier enforcement agencies. The FMCSA regulations that affect the ability of motor carriers to engage in interstate travel to meet evacuation and other disaster-related needs include limits on the hours that a driver may be on duty, motor carrier registration and operating authority, and hazardous materials safety requirements. In addition to the Federal regulations for interstate carriers, States also regulate commercial vehicle operations including registration, fuel tax reporting, and size and weight limits.

The FMCSA supports ESF-1 functions through waivers of regulations and other actions to expedite transportation of passengers and supplies in an emergency. For instance, FMCSA's regulations provide for regulatory relief from the hours-of-service provisions (49 CFR 390-399) upon the declaration of regional or local emergency by the President, the governor of a State, the representatives, or the FMCSA Field Administrator.<sup>115</sup>

The FMCSA headquarters and field staff also help staff the CMC when it is activated for a disaster or elevated threat level. The FMCSA staff serve as subject matter experts and liaisons between the industry and the government. FMCSA subject matter experts provide technical assistance to industry associations and individual companies on how to secure interstate operating authority and how to meet the safety regulations so that they can participate in emergency response contracts, as well as how they can volunteer equipment and services. In a national disaster, truck and bus operators may be eager to offer their services for contract or as volunteers. However, the deployment of large volunteer operators needs to be coordinated so that their services are effectively used and to ensure that they will have specific tasks, fuel, maintenance, lodging, and security once they are on site. Spontaneous volunteers can turn into part of the problem if they become stranded in the disaster area.

### *FMCSA and Motor Coach Industry Response to Hurricanes Katrina and Rita*

During Hurricanes Katrina and Rita, FMCSA functioned as a clearinghouse of information for truck and bus companies on obtaining the authorizations operators needed to operate legally outside of normal regulatory constraints under emergency conditions. In addition, FMCSA instructed drivers and operators on the necessary steps to ensure that they were in compliance with the rules and regulations of the states that they might need to traverse (some states suspended no motor carrier regulations and others suspended differing sets of rules for varying lengths of time).

FMCSA established a single point of contact (POC) for the industry. The POC was backed up by a technical advisory team that was available around the clock to make complex regulatory interpretations. FMCSA estimates that it responded to an estimated 300 to 400 carrier calls. FMCSA established a Katrina web page providing up-to-date information on emergency declarations and answers to frequently asked questions regarding regulatory exemptions during the emergency.

To facilitate the transportation of supplies and services to the disaster areas, emergency declarations were issued by the President and by FMCSA. These declarations have triggered the temporary suspension of parts 390-399 of the federal safety regulations, including hours-of-service requirements for motor carrier drivers. Additional waivers were granted to motor carriers and drivers engaged in specific aspects of the emergency relief effort as follows:

**FMCSA Regional Emergency Declaration for carriers and Drivers**

**Transporting Certain Fuels.** FMCSA issued Regional Emergency Declarations lasting until October 5, 2005 for the transportation of gasoline, diesel, jet fuel, natural gas /CNG, propane and ethanol to, from and within the States located within its Eastern and Southern regions.

**Presidential Declaration of Emergency Relief for the States of Alabama, Arkansas, Florida, Louisiana, Mississippi, and Texas.** Motor carriers and drivers providing direct emergency relief to, from, or within the areas covered by the Presidential declarations, regardless of commodity carried.

**Presidential Declaration of Emergency Relief in Support of Evacuees for the States of Arizona, Colorado, Georgia, North Carolina, Oregon, Tennessee, Utah, Virginia, and West Virginia.** Motor carriers and drivers providing items needed to house, clothe, and feed evacuees to, from, or within the areas covered by the Presidential declarations.

An additional measure taken by FMCSA was to allow intrastate carriers to receive 120 day temporary interstate operating authority. FMCSA waived the associated \$300 fee. FMCSA estimates that 30 percent of the carriers fulfilling Federal contracts for emergency relief operations were intrastate carriers operating under temporary authority.

The motor coach industry responded to the ESF-1 call to mobilize buses to evacuate people from New Orleans. Over 1,100 buses and drivers were hired and evacuated approximately 218,000 people.

In addition, school buses were also used in the evacuation. One report notes that school bus drivers and vehicles from Zachary and West Baton Rouge Parish in Louisiana arrived in New Orleans on August 30 when first asked by the Louisiana Corrections Department to move corrections officers to New Orleans and prisoners out of Orleans Parish. These drivers also helped evacuate the Superdome, rescue stranded residents from other staging areas, transport the National Guard, and move supplies.

For Hurricane Rita, the bus industry assisted in the evacuation before landfall of the hurricane. Texas officials called the American Bus Association (ABA) for assistance in locating suppliers of bus services. Using information compiled during Hurricane Katrina, the ABA notified operators in 14 States of the requirement enabling State and local officials in Texas to acquire the needed buses for the planned evacuation.

## **U.S. Maritime Administration (MARAD)**

Among the wide variety of MARAD's programs, those most germane to hurricane response include programs to ensure reserve shipping capacity for use in times of national emergency and promote the development and maintenance of the domestic ship building and repair industries, efficient ports, and intermodal systems.<sup>116</sup> DOT does not have authority to regulate the operation of maritime transportation; that authority resides with the U.S. Coast Guard, an agency of DHS. MARAD maintains the Ready Reserve Force (RRF), currently consisting of 58 vessels that are ready to be activated at short notice in a national emergency. All the vessels in a higher state of readiness have home ports along the coastal areas of the United States, with the exception of three vessels in Japan, and may be used for hurricane relief. MARAD also has approximately 10-20 ships in the National Defense Reserve Fleet (NDRF) which have utility for disaster assistance as "berthing ships," tankers (water or oil) and cargo carriers. The RRF and NDRF vessels are usually activated to support the Department of Defense in deploying and resupplying U.S. armed forces. In response to hurricanes Katrina and Rita, the Secretary of Transportation, with concurrence from the Secretary of Defense, activated ships for the first time for disaster relief purposes. MARAD also owns six merchant mariner training ships that are on loan to six State Maritime Academies that may also be useful for disaster assistance. One of the ships is stationed in Texas.

MARAD headquarters and field staff also provide support to the CMC when it is activated for a disaster or elevated threat level. The MARAD staff serves as subject matter experts and liaisons between the maritime industry and the government.

### *MARAD and Maritime Industry Response to Hurricanes Katrina and Rita*

Ten MARAD ships in its RRF were activated to aid in the response and recovery to Hurricanes Katrina and Rita. Through the ESF-1 program, the U.S. DOT and MARAD coordinated with FEMA on the availability and capacity of the ships. FEMA provided mission assignments, funding, and directions to the ships while MARAD retained operational control of the RRF vessels. The activation of these ships for a domestic emergency was unprecedented and provided the Gulf Coast with supplies, water, electricity, and food and shelter for rescue and recovery workers. MARAD ships provided 269,570 meals and 83,165 berth nights for recovery workers and evacuees.

In preparation for Hurricane Rita, MARAD ships were stationed as shelters for equipment and emergency responders prior to the hurricane to support post-storm evacuations and recovery activities. The ships sheltered police dogs, emergency equipment, and personnel from six jurisdictions. The ships allowed emergency personnel and equipment to be sheltered during the storm so that they could be rapidly deployed for post-event evacuations and emergency response.

Approximately 16 U.S. Navy merchant marine reservists were called upon by MARAD and responded in the field and at standing watches at DOT Headquarters. Most of these reservists were graduates of the U.S. Merchant Marine Academy and the six State Maritime Academies, and had a wide range of experience from their civilian maritime-related careers. During the

Katrina/Rita relief efforts, those in the field augmented MARAD staff providing assistance. The fact that they were in uniform was a key to expediting recovery efforts since Federal and State authorities and the public at large recognized the uniforms.

Maritime resources were used more in the rescue phase of the emergency response to Hurricane Katrina than in the evacuation. However, three ferries from the Crescent City Connection Ferry and a tug and barge worked with the U.S. Coast Guard vessels to transfer a large number of evacuees from Chalmette over to the west bank (Algiers). Private-boat owners also helped to support the evacuation of flooded areas after Hurricane Katrina.

## Endnotes

<sup>1</sup> National Response Plan (NRP), pg. 63.

<sup>2</sup> “Our cities must have clear and up-to-date plans for responding to natural disasters, and disease outbreaks, or a terrorist attack, for evacuating large numbers of people in an emergency, and for providing the food and water and security they would need. In a time of terror threats and weapons of mass destruction, the danger to our citizens reaches much wider than a fault line or a flood plain. I consider detailed emergency planning to be a national security priority, and therefore, I’ve ordered the Department of Homeland Security to undertake an immediate review, in cooperation with local counterparts, of emergency plans in every major city in America.” President George W. Bush, (New Orleans, Louisiana, September 15, 2005).

<sup>3</sup> Recommendation 43 of the White House report (“The Federal Response to Hurricane Katrina: Lessons Learned”) sets forth that the Department of Homeland Security, in coordination with the Department of Transportation, should “evaluate all State evacuation plans as well as the evacuation plans of the 75 largest urban areas.” (Washington, D.C., February, 2006).

<sup>4</sup> The DHS study is known as the Nationwide Plan Review. In February 2006, DHS issued its Phase 1 report, which is intended to meet the Congressional requirement to provide the status of catastrophic planning in all States and 75 of the Nation’s largest urban areas, and the President’s direction to review emergency operations plans for the Nation’s major cities. Each State and urban area certified the status of its Emergency Operations Plans and identified when plans were last updated and exercised. The Phase 1 results presented in this report are the initial findings based on the self-assessments received from the States, territories, and urban areas. DHS is conducting a second phase of the Nationwide Plan Review to validate submissions and determine requirements for on-site planning assistance. DHS has enlisted teams of former State and local homeland security and emergency management officials to visit each State and territory, and the 75 urban areas and perform a peer review of their plans. The results of these visits and specific recommendations to strengthen catastrophic planning will be provided in a report to the President and Congress before June 1, 2006.

<sup>5</sup> Sec. 10204, “Catastrophic hurricane evacuation plans,” Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU),” Public Law 109-59, 109th Congress, August 10, 2005.

<sup>6</sup> “The Federal Response to Hurricane Katrina: Lessons Learned,” p. 5.

<sup>7</sup> “2005 Season Recap: NOAA Overview,” National Ocean & Atmospheric Administration, website, <http://www.noaa.gov/>. Direct link to article is <http://www.noanews.noaa.gov/stories2005/s2540.htm>.

<sup>8</sup> “Federal Response to Hurricane Katrina: Lessons Learned,” pg. 18.

<sup>9</sup> FEMA SLG 101: Guide for All-Hazard Emergency Operations Planning, Glossary of Terms, September 1996, pg. GLO-5.

<sup>10</sup> FEMA SLG 101: Guide for All-Hazard Emergency Operations Planning, Glossary of Terms, September 1996, pg. GLO-6.

<sup>11</sup> FEMA SLG 101: Guide for All-Hazard Emergency Operations Planning, Glossary of Terms, September 1996, pg. GLO-6.

<sup>12</sup> “Are You Ready: Basic Preparedness Guide,” FEMA website, [http://www.fema.gov/pdf/areyouready/basic\\_preparedness.pdf](http://www.fema.gov/pdf/areyouready/basic_preparedness.pdf).

<sup>13</sup> Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by Public Law 106-390, October 30, 2000, <http://www.fema.gov/library/stafact.shtm#3>.

<sup>14</sup> “Planning Scenarios: Executive Summary,” Introduction, The Homeland Security Council, July 2004 pg. i.

<sup>15</sup> “The National Preparedness Goal: HSPD-8 Implementation Newsletter,” DHS Office of State and Local and Government Coordination and Preparedness, Issue 01: July 25, 2005.

<sup>16</sup> “Preparedness Directorate Information Bulletin No. 197: National Plan Review, Preparedness Directorate,” Office of Grants and Training, Department of Homeland Security, November 23, 2005, pg. 2.

<sup>17</sup> FEMA SLG 101: Guide For All-Hazard Emergency Operations Planning, Forward, Federal Emergency Management Agency, September 1996.

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<sup>19</sup> National Fire Protection Association (NFPA) web site, <http://www.nfpa.org/categoryList.asp?categoryID=143&URL=About%20Us>.

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- <sup>22</sup> FY2005 Emergency Management Performance Grants (EMPG) Program Guidance and Application Kit, November 2005, <http://www.ojp.usdoj.gov/odp/docs/fy2006empg.pdf>.
- <sup>23</sup> Office of Grants and Training, Competitive Training Grants website, [http://www.ojp.usdoj.gov/odp/training\\_ctgp.htm](http://www.ojp.usdoj.gov/odp/training_ctgp.htm) .
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