Evacuation Preparedness of Public Transportation and School Buses

In

Rural Coastal Communities of the North Gulf Region

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ACKNOWLEDGEMENTS

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GLOSSARY OF ACRONYMS

CURIS	Center for Urban Rural Interface Studies
DPS	Department of Public Safety
DOE	Department of Education
DOT	Department of Transportation
EMA	Emergency Management Agency
EOC	Emergency Operations Center
ETIS	Evacuation Traffic Information System
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
ITS	Intelligent Transportation System
NGM	Northern Gulf of Mexico
OES	Office of Emergency Services
TRB	Transportation Research Board
WTI	Western Transportation Institute

EXECUTIVE SUMMARY

According to the Federal Highway Administration (FHWA), nearly 40 percent of the country's transit-dependent population—primarily senior citizens, persons with disabilities, and low-income individuals—live in rural areas. Due to a lack of travel services, rural populations are more dependent on automobiles than their urban counterparts. When an evacuation takes place, rural coastal communities are at high risk, and difficult to evacuate in a timely manner due to larger geographical areas, low population densities and limited resources. Coastal communities along the Interstate 10 (I-10) corridor from Florida to Louisiana are predominantly rural. When natural disasters occur, rural coastal communities are difficult to evacuate quickly. To help address the issue, public transportation can be a successful partner for rural areas in accomplishing the four tasks of emergency management planning: (1) mitigation, (2) preparedness, (3) response, and (4) recovery.

The objective of this study was to assess the emergency preparedness of public transportation and school bus systems in rural coastal communities in the Gulf Coast region. The assessment focused on how adequately transit systems were prepared and what role they could play in the event of an emergency/evacuation event. For the assessment, a survey was adopted as the methodology. The survey was distributed to 46 public, private, and school transportation agencies within the 24 coastal counties of Florida, Alabama, and Mississippi, and four parishes of Louisiana in the Northern Gulf of Mexico region (NGM). Twenty four surveys were returned for a 52 percent response rate. The survey focused on the following topics:

- Transit services provided in rural areas;
- Communication systems used for transit;
- Ridership information and estimation;
- Information specific to emergency events;
- Transit employee issues;
- Evacuation preparation;
- Transit expenditures and revenue, and purchased transportation for emergency events; and
- Assessment of transit needs/coordination.

The survey results of rural transit systems conducted for this assessment provided many insights on transit operations during evacuations, and how rural transit systems had become successful partners in complex, multi-agency emergency operations. Major findings of the survey include the following:

- In an emergency event, transit agencies became more flexible in their service delivery and provided more demand-response services.
- Passenger assistance levels increased when the transit systems moved from routine operations to emergency events.
- Transit services were active in improving coordination, conducting regular mock drills, increasing participation of people and transit, and establishing mutual aid agreements.
- Funding for evacuation-related operations and capital expenses for transit was the most significant and frequently cited concern related to emergency planning.

- Concern for families and personal well-being had prevented transit employees from reporting to work during an evacuation in the past.
- School bus systems emerged as a critical resource, because they were safe, reliable and readily available resources for rural evacuation operation.

Rural transit systems had also fulfilled their assigned role within their own local emergency management operations. However, this role was largely limited to the "preparedness" activity of emergency management—readiness to evacuate people out of the dangerous zone by responding to specific requests. Lessons learned from this assessment may be utilized in improving rural evacuation practices in the following areas:

- Technical issues such as sparse communication network coverage in rural areas or network breakdown hinder evacuation operations. Transit agencies equipped with satellite phone technology and passenger information that would help to disseminate information more efficiently will help in coordinating an evacuation operation.
- Employee responsibilities in emergency events should be well defined in job descriptions and reinforced with necessary job training. A "prior commitment" form could be signed by employees during the hiring process, along with notification of defined emergency assistance benefits for serving in emergency events.
- In the reauthorization of the SAFETEA-LU, it is suggested that Congress recognize the inadequate finance issue and authorize the Federal Transit Administration (FTA) or the Federal Emergency Management Agency (FEMA) to reimburse transit evacuation expenses including operation, training, and preparation for local, state, and national level disasters.

Many of the issues identified by transit agencies are also a concern for school bus systems. However, the following advantages and disadvantages of using school buses should be considered during emergency management planning:

- *Advantages:* School buses are equipped to deal with altered schedules and weather conditions. They are highly visible in traffic and can be given priority in a queue. Schools can act as shelters and school resources such as nurses, drivers, mechanics, and safety officers can be utilized in evacuation operations.
- *Disadvantages:* Adult capacities on buses intended to carry children are limited. Drivers have to rely on local Emergency Management Agencies (EMAs) for passenger information. Buses are not equipped with air conditioning. Moreover, they have limited wheelchair accessible spaces.

1. INTRODUCTION

Coastal communities of the Northern Gulf of Mexico (NGM) along the Interstate 10 (I-10) corridor from Florida to Louisiana are predominantly rural and are under frequent threat of hurricane, flood, and heavy rainfall almost every fall season. During recent natural disasters such as the devastating hurricanes Katrina and Rita in 2005, people in coastal communities required mass evacuation and other major emergency transportation services. While planning and coordination among emergency management, law enforcement and transportation agencies led to an effective system allowing anyone with a car to evacuate from urban areas, many vulnerable and public-transportation-dependent rural residents along the I-10 corridor from Florida to Louisiana were literally left behind. When evacuation takes place, rural coastal communities are at high risk and difficult to evacuate in a timely manner due to larger geographical areas, low population densities, and limited resources such as alternate modes of transportation, food, fuel, lodging, and medical facilities.

Before 2005, public transportation operators in the United States did not take the lead on evacuation planning, nor were they viewed as a viable option for evacuation. Now, there is increased national awareness and interest in the role of public transportation in evacuation. Typically, emergency management agencies (EMAs) such as police, fire, and emergency medical services—the first responders to an incident—take the lead in an evacuation. However, public transportation can perform multiple roles in evacuation and can be a successful partner in the four tasks of emergency management planning: (1) mitigation, (2) preparedness, (3) response and (4) recovery. For example, transit can provide evacuation for vulnerable, transit-dependent populations. Transit drivers can transport emergency personnel and equipment to an incident site. During reentry, after the emergency has passed, transit providers can move transportation-dependent evacuees to their original locations or other destinations, help supply real-time information on the extent of damage, and assist in efforts to resume normal service as quickly as possible.

The 2006 Nationwide Plan Review published by the Department of Homeland Security in cooperation with the U.S. Department of Transportation, indicated that very few states or large urban areas have adequately planned for evacuating people who are dependent on public transportation. This report also noted that most evacuation planning efforts focused on evacuation by personal vehicle with very little attention given to the role of public transportation systems (Committee on Nationwide Plan Review Phase 2 2006). As compared to urban areas, rural areas are underserved by public transportation. However, school bus systems can serve as a substitute for public transportation in emergency events as they are widely available in rural areas throughout the nation. In fact, sometimes school bus systems are the only means of public transportation in rural areas. Information related to transit use in evacuations and emergency events is widely available for urban areas, but there is limited knowledge on rural public transportation. In addition, nearly 40 percent of the country's transit-dependent population—primarily senior citizens, persons with disabilities, and low-income individuals—live in rural areas. Public transportation in rural areas is expected to play a greater role than envisioned for routine and emergency events. Thus, now is the time to investigate the role and assess the capabilities of public transportation and school buses in emergency management for rural areas.

The objective of this study was to evaluate the emergency preparedness of public transportation in selected rural coastal communities in the NGM. The selected geographical area for this study covered 24 counties and four parishes along the I-10 corridor from Florida to Louisiana

(Appendix A). In the 28-county study area, 75.5 percent of all citizens live in rural settings and 12.7 percent of citizens are age 65 or older (Appendix B, EDIS 2009). The assessment focused on what role public transportation and school districts could play in the event of an emergency evacuation and how adequately they were prepared. These questions were answered based on the literature review and through the survey conducted for public transportation and school bus systems. This study was divided into the following three tasks:

1. Literature Review, Data Collection and Analysis;
2. Assessment of Rural Transit Services in terms of Emergency Preparedness; and
3. Best Emergency Management Practices for Public Transportation.

Task 1. Literature Review, Data Collection, and Analysis (Chapter 2)

The Literature Review provided information on planning, implementation and operation documents from public transportation systems, the Transportation Research Board, the Federal Emergency Management Agency (FEMA), local EMAs, state departments of transportation (DOTs), etc. This literature review focused on the following:

- The nature of emergency evacuations in rural areas;
- The role of public transportation in evacuation;
- Current evacuation practices for rural areas; and
- Lessons observed from recent emergency evacuations applicable to rural areas.

In addition, data collected from sources such as the Census and Economic Information Center, FEMA, Department of Health and Human Services, National Center for Senior Transportation, Rural Planning Organization of America, local transit agencies, metropolitan planning organizations, city and county governments, and EMAs were compiled, analyzed and incorporated into further tasks.

Task 2. Assessment of rural transit services in terms of emergency preparedness (Chapter 3)

Compared to private vehicle evacuations, public transportation is more complicated and involves overcoming several challenges related to (1) infrastructure and communication; (2) coordination of local, state and federal agencies; (3) legal and social barriers; (4) federal guidelines and funding; and (5) incorporation of evacuation in regular planning. Thus, this task investigated the local public transportation providers' preparedness to overcome these challenges. This task included a survey of local public transportation service providers.

The following topics related to public transportation services were covered in the survey:

- Transit services provided in rural areas;
- Communication systems used for transit;
- Ridership information and estimation;
- Information specific to emergency events;
- Transit employee issues;
- Evacuation preparation;
- Transit expenditures and revenue, and purchased transportation for emergency events; and
- Assessment of transit needs/coordination.

Figure 1 provides a diagram of the research process.
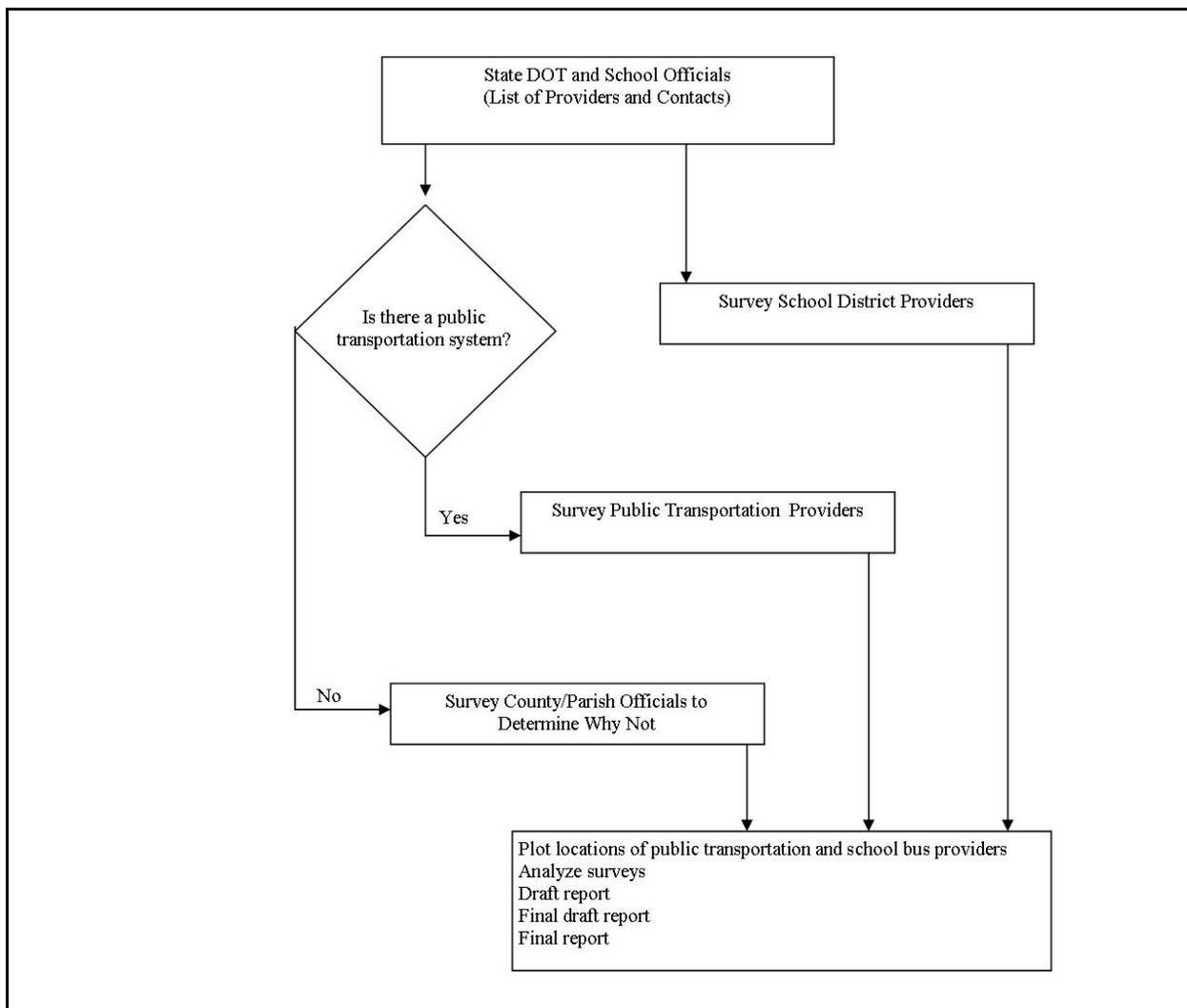
Figure 1. Research Process Diagram

Task 3. Best emergency management practices for public transportation (Chapter 4)

Based on lessons learned from Tasks 1 and 2, this task was intended to establish best emergency management practices for rural public transportation that included the following topics:

- Effective ways to identify and communicate with public-transportation-dependent people before and after an emergency evacuation., and

- Best practices to ensure training and availability of the transit workforce for evacuation assistance programs.

The final chapter (Chapter 5) presents the recommendations and conclusions for improving rural transit evacuation operations along with further research needs.

2. LITERATURE REVIEW

A considerable body of literature exists on the role of transit in emergency evacuations. The literature has become extensive since the 9/11 terrorist attacks on the World Trade Center and Hurricane Katrina. In fact, a transit system played an important role in evacuating people from around the World Trade Center following the September 11 attacks. These two events became the impetus for investigating the role of transit in evacuation and emergency events.

This literature review focused on providing information on the following topics:

- The nature of emergency evacuations in rural areas;
- The role of public transportation in evacuation;
- Current evacuation practices for rural areas; and
- Lessons observed from recent emergency evacuations applicable to rural areas.

Emergency management planning in rural areas was generally focused on the local population with not much attention paid to the mass influx of urban evacuees from nearby urban and suburban areas during an emergency event. For the first time, an urban-to-rural evacuation process was identified in a study, titled "Urban to Rural Evacuation: Planning for Rural Population Surge" by the Walsh Center for Rural Health Analysis. Researchers interviewed 17 preparedness experts and planners at the national and local levels to assess the possibilities of urban evacuation to rural areas and to provide recommendations for rural evacuation planning and responses. The study analysis found that urban evacuees were likely to travel to and through rural areas. Traffic flow in rural areas might result in unexpected traffic jams and blockages that would impact limited road capacity. People evacuated to rural areas might increase consumption of fuel and food in limited supply, and use roadside amenities beyond their capacity. Researchers recommended two important areas to be researched: (1) estimation and information collection about urban-to-rural evacuees, and (2) identification of sites in rural areas where evacuees can be sheltered and provided resources (Meit, Briggs and Kennedy 2008). The study's findings indicated that rural transit might be used by outside evacuees other than the local population, and that may have an impact on the limited capacity of transit in those rural areas.

An emergency management plan of any organization generally involves a series of documents, activities, education programs, trainings, mock drills and stakeholders. A plan can be divided into four tasks: (1) mitigation—developing a plan to reduce damage loss and impact; (2) preparedness—developing a plan for readiness; (3) response—developing a plan for action/operation; and (4) recovery—developing a plan for resuming normalcy. Public transportation can perform multiple roles in evacuation and be a successful partner in these four tasks of emergency management plans:

(1) Mitigation:
- protect its own assets (e.g., moving transit vehicles to a safe place during severe flooding and fire incidents); and
- establish redundant communication systems.

(2) Preparedness:
- help in preparing local emergency management plan;
- represent the various modes of transportation in the emergency command structure; and
- prepare its vehicles to be supplied on demand to law enforcement and emergency management agencies for non-transit purposes.

(3) Response:
- evacuate vulnerable, transit-dependent populations;
- transport emergency personnel, volunteers, and equipment to an incident site;
- provide temporary shelter for evacuees; and
- transport food, fuel and other supplies.

(4) Recovery:
- resume normal service as quickly as possible;
- move transit-dependent evacuees to their original locations or other destinations; and
- help supply real-time information on the extent of damage (White et al. 2008, Balog et al. 2005).

On January 1, 1997, a voluntary evacuation was ordered due to a flood in California's Yuba and Sutter counties (Sacramento Region). During the evacuation operation, a local emergency management agency was reminded about the potential role of transit to evacuate citizens without personal vehicles and the transit system was incorporated into the evacuation operation at the last minute. Due to this last-minute involvement, rural transit operators faced challenges such as lack of communication between transit agencies and the local office of emergency services (OES), the unidentified role for transit agencies in the evacuation, and lack of knowledge on the part of transit agencies about local emergency planning procedures and protocol (SACOG 2009). In 2007, a mock drill of a transit service evacuation operation was conducted in the Sacramento Region with financial assistance from the Department of Homeland Security. The purpose of this mock drill was to identify the gaps in the interaction among transit operators and local emergency operation centers (EOCs) and in the communication and operation coordination between transit agencies and local emergency management agencies. This mock drill highlighted the following weaknesses in evacuation operations: an inaccurate emergency communication plan for EOCs resulted in delaying operational decisions, a lack of leadership within the EOCs to assign transit's role and responsibilities, and a lack of training for transit operators in communicating effectively and understanding the emergency management plan and procedures (SACOG 2009). Refer to Appendix C for the detailed case study of these two events.

By request of Congress, the Transportation Research Board (TRB) prepared a special report titled, "The Role of Transit in Emergency Evacuation." The Federal Transit Administration funded this study to explore the capacity of transit systems in emergency evacuation for the nation's 38 largest urbanized areas (serving populations greater than one million). Bus, rail, paratransit, demand-responsive, commuter rail, and ferry were considered as transit for this study. Comprehensive review of the emergency management plans and transit systems of the 38 urban areas revealed that transit could play an important role, but that most emergency management plans did not incorporate all available modes of transportation that could be utilized for evacuation. Further, the study indicated that there was a lack of regional vision that could have assisted in the preparation of such emergency plans. The study recommended the following topics for further research:

1. To enhance understanding of the spatial dimensions of the demand and supply of transit services in an evacuation;
2. To find an assessment method for availability of, and inventorying the allocation of, transit buses, equipment, and drivers; and

3. To formulate strategies to incorporate other private transportation providers such as charter buses, rental cars, or taxis for evacuation.

The literature review conducted for this study provides the most comprehensive and up-to-date information on the role of transit in emergency evacuation and highlights the topics that need to be addressed (White et al. 2008).

The Center for Urban Transportation Research at the University of South Florida assessed the emergency planning and response of Florida transit systems during the 2005 hurricane season on a request from the Florida Department of Transportation. In the 2005 hurricane season, hurricanes Charley, Frances, Ivan, and Jeanne hit the state within a six-week period. Although Florida had an advanced state emergency operation management system and structure and public transit agencies were actively involved in handling emergency events and evacuations, a survey conducted for this evaluation on evacuation operations identified several deficiencies and concerns involving communication, coordination, education, specialized needs, finance, passenger statistics, required resources, etc. This report identified 23 best practices for improved transit emergency response management. Some of the practices advocated for a good emergency plan, clarifying transit staff expectations and duties, coordination with local school transportation systems, conducting mock drills, using volunteers on evacuation buses, employee support and assistance programs, etc. (Goodwill and Reep 2005). These practices were relevant for other transit services as well.

Public Transportation Emergency Mobilization and Emergency Operation Guide—TCRP report 86, Public Transpiration Security Series, Volume 7, highlighted the key considerations for the use of transit in evacuations: (1) to promote early recognition of emergency events, (2) to expedite response to an emergency event, (3) to coordinate an evacuation process, and (4) to ensure that transit services are available to support the evacuation operation. This document provided recommendations and tools based on an extensive research effort conducted with public transportation systems through a conference and a survey. A nationwide survey of large, medium and small public transportation systems including rail and ferry revealed that 32 percent of systems were concerned that transit systems might not be fully used during evacuations; 66 percent of systems had their emergency management plans; 57 percent of systems had coordination plans with other nearby transit systems; and only 40 percent of transit systems had trained personnel to handle emergencies (Balog et al. 2005).

In 1999, the Texas Transportation Institute conducted a telephone survey of 48 Texas transit agencies to determine role, preparedness, and involvement of the transit system in emergency events. The telephone survey results indicated that out of 33 rural and non-metropolitan transit agencies, only seven agencies participated in their respective local emergency planning; 19 had informal or formal agreements with cities/counties to provide vehicles and drivers for emergency response; and four had no involvement in any kind of emergency management plan but were willing or scheduled to prepare a plan (Higgins, Hickman and Weatherby 1999).

The Urban Transportation Center at North Carolina A&T State University sponsored an advanced study to focus on modeling transit issues associated with hurricane evacuation planning. Traffic congestion-relieving measures such as determining the total evacuation time, identifying traffic bottlenecks, and assessing the traffic operation strategies for easy exits of transit buses in traffic were considered for modeling. The simulation model prepared for this study was based on Behavioral Analysis Model for evacuees, Demographic Model, and the

Traffic Simulation model of the Oak Ridge Emergency Management Systems. While preparing the model, researchers assumed that buses were located at the same bus terminal. Each bus was assigned predetermined pick-up points and routes to reach safe destinations. This study identified further research needs in developing a methodology to determine the scheduling of buses for evacuation events along with the expected time required to evacuate the entire population, and examining the impact of potential traffic congestion locations, route selection, and travel time on transit operation (Perkins, Dabioi and Han 2001).

At the time of an Air Ontario jet crash near Dryden in Northern Ontario, Canada, school buses proved to be of beneficial use for a small community where the school buses were the only means of public transportation. The school buses helped to move the injured to a hospital. On the day of the 9/11 terrorist attacks, school buses helped transport 6,600 passengers from an airport to shelters in Gander, Newfoundland, Canada. The buses also helped in recovery operations moving the passengers back to the airport. The issue with using school buses was that the school authorities maintained the control of buses and drivers were not allowed to make their own decision to handle situations. The decision-making process became tough as school authorities had to choose between providing school transportation and helping with community evacuations. However, the bus fleet deployment was an easy task due to the fact that the school bus system routinely dealt with issues such as altered bus schedules, traffic congestion, and weather and equipment. As such, drivers and buses were ready to perform any given task (Scanlon 2005).

After learning lessons from wildfire and flood emergency evacuations, the California Department of Transportation (Caltrans) launched an aggressive program focused on transit personnel, emergency management officials, and citizens for the emergency management needs of California's rural transit systems. This program clearly defined the actions to be taken by Caltrans, emergency management agencies, first responders and transit authorities. These actions were identified through educational programs, including lectures by nationally recognized experts on emergency management, roundtable discussions on best practices and emergency trends in transit for emergency response, and tabletop exercises to identify gaps in transit and local emergency management plans and protocols (Communique USA 2008a).

The Caltrans study and the studies referenced above offer many suggestions, advocate for new strategies, and present relevant concerns for identifying the role and efficient use of transit in evacuation. The following are lessons learned from this literature review.

Lesson 1: Increase participant awareness of transit's role and the critical issues surrounding the four elements of emergency management planning: mitigation, preparedness, response, and recovery.

Lesson 2: Foster and support pre-established institutional relationship/mutual aid agreements among transit authorities, transportation departments, emergency and law-enforcement agencies, emergency responders, health care facilities, and media.

Lesson 3: Conduct regular emergency management planning exercises, education programs, training programs, and mock drills.

Lesson 4: Encourage an environment supporting sustained information sharing and routine interaction among agencies that manage transportation systems.

Lesson 5: Identify areas of improvement for rural transit including safety, security and reliability before, during and after emergencies, and determine steps for improvement (Communique USA 2008b, Communique USA 2008a, Goodwill and Reep 2005).

The above literature review indicates that detailed studies of the role of transit in evacuation for urban areas are numerous and the topic continues to be investigated. However, studies related to rural transit's role in evacuation are spare. The above studies are summarized in Table 1.

Table 1. Summary of Reviewed Studies

Report Title, Study Scope, and Focus Area	Report Authors and Date	Addressed Topics
Nationwide Plan Review Phase 2 Report Study scope: National Focus area: Urban	Committee on Nationwide Plan Review Phase 2, 2006	Review and assessment of the status of catastrophic and evacuation planning in all states and 75 of the nation's largest urban areas.
Urban to Rural Evacuation: Planning For Rural Population Surge Study scope: National Focus area: Rural	Meit, Briggs and Kennedy, 2008	Assessment and impact of urban evacuation to rural areas
The Role of Transit in Emergency Evacuation Study scope: National Focus area: Urban	Transportation Research Board, 2008	Evaluation of urban transit systems preparedness and role for emergency evacuation
Transit Emergency Planning and Response Assessment Initiative Study scope: State Focus area: Urban, Small Urban, Rural	Goodwill and Reep, 2005	An evaluation and assessment of public transportation system's emergency planning effort
Role of Public Transportation Operations in Emergency Management: Research Report Study scope: State Focus area: Urban, Small Urban, Rural	Higgins, Hickman and Weatherby, 1999	Role of public transportation in emergency events, Guidelines for developing emergency management plan

Report Title, Study Scope, and Focus Area	Report Authors and Date	Addressed Topics
Modeling Transit Issues Unique to Hurricane Evacuations: North Carolina's Small Urban and Rural Areas Study scope: State Focus area: Small Urban, Rural	Perkins, Dabioi and Han, 2001	Hurricane evacuation transit model based on traffic congestion
Rural Transit Response and Recovery Conference—After Action Report Study scope: State Focus area: Small Urban, Rural	Communique USA, April 2008	Emergency Planning Education, Future Planning initiatives
Rural Transit Emergency Planning Guidance Study scope: State Focus area: Small Urban, Rural	Communique USA, July 2008	Emergency Planning Guidelines

3. ASSESSMENT OF CURRENT PRACTICES

Some of the suggestions, strategies, concerns and other additional relevant topics listed in Chapter 2 are critical and need to be examined, identified and practiced before transit can be considered a prominent transportation mode for evacuation. A majority of the studies focused on public transportation systems' performance as a part of the evacuation management systems rather than focusing on an individual system's performance and preparedness. Moreover, only rare studies investigated the school bus systems' individual performance and role in evacuations. An evacuation preparedness survey including qualitative and quantitative data was designed with the intent to address these concerns. The survey questionnaire was divided into the following categories:

1. Transit services provided in rural areas
2. Communication systems used for transit
3. Ridership information
4. Information specific to emergency events
5. Transit employee issues
6. Evacuation preparation
7. Transit expenditures and revenue, and purchased transportation for emergency events
8. Assessment of transit needs/coordination

A detailed list of topics within each category follows.

Transit services provided in rural areas:
- Modes of transit service delivery.
- Level of passenger assistance provided for users of transit service in routine operation and emergency/evacuation events.
- Maximum distance transit would allow its vehicles to travel for an evacuation.
- Information on vehicle fleet used in the transportation services provided directly by transit agency.

Communication systems used for transit:
- Type of communications device/system used on a daily basis and in an emergency/evacuation event. The device/system included cellular phones, two-way mobile radios requiring FCC license, pagers, satellite phones, telephone (landline), automatic vehicle location system, report submitted electronically, email (Blackberry), and facsimile.
- Communication resources available for riders to make an advanced reservation for evacuation. The communication resources may include on-line hurricane registry, calling toll-free number, calling 311 or 911, facsimile, telephone, email, etc.
- Policy to accommodate rider with no advanced reservation in an emergency/evacuation event.

Ridership information:
- Transit agency's most recent evacuation passenger statistics. For example, estimated ridership, actual transit service requested, actual service provided, and unmet needs.

- Methodology to estimate ridership for an emergency/evacuation event. Methodologies may be based on regularly maintained inventory, daily ridership, an inventory provided by faith-based organization, event-specific request, census data, or an inventory provided by emergency management agencies.

Information specific to emergency event:
- Having an emergency operation plan for the transit agency.
- Transit agency's participation in the county/state emergency operation center in case of emergency evacuation.
- A mutual aid agreement with other transit providers in service area for coordination during an emergency/evacuation event.
- An established communication protocol with agencies such as law enforcement, Federal Emergency Management Agency, Department of Transportation, medical center/health facilities, county/state emergency management center, local traffic management agency, and shelter facilities.
- Evacuation information dissemination and policy.
- Participation in reentry preparations including radio inspection/assessments prior to reentry, traffic management, debris removal, restoration of traffic control, restoration of road infrastructure.
- Participation in mock training drills/evacuation preparedness exercises.

Transit employee issues:
- Employee training to serve special needs population. The special needs population includes the elderly, people with disabilities and other medical conditions, careless residents (residents who do not give attention or thought to avoiding harm), people with limited English proficiency, people with hearing and visual impairments, people with service animals or pets.
- Statistics for employees who reported to work on the most recent evacuation call including transit director, transit dispatcher, drivers (full-time), drivers (part-time), mechanics.
- Compensation to transit employees for working in an emergency/evacuation event.
- Assistance to employee families during evacuation.
- Arrangements for evacuation of the families of transit employees whom transit agency would expect to work during an emergency evacuation.
- Training for transit employees on the following topics:
  - Driving in hurricane traffic zone
  - Assistance to special needs population
  - Emergency management
  - Reverse lane driving
  - Emergency communication
  - Primary medical services (First Aid)
  - Incident command system/management
- Employee-related issues associated with past emergency/evacuation event.

Evacuation preparation:
- Preparation time required to implement transit agency's emergency management plan to evacuate people.
- Evacuation warnings and evacuation-related public information provided to the public and special facilities. The following media types included in the survey: TV, radio, loudspeaker, government-owned radio, print media, text messaging, emergency alert system, sirens, knocking on doors, etc.
- An inventory of passengers with special needs who would need transit service in an emergency/evacuation event.
- Dedicated, accessible, and operational fueling sites for fueling transit vehicles in case of emergency and electric power loss.
- Back-up arrangements for bus maintenance/operation facility in case of electric power losses.
- A security plan to protect transit resources/facilities.
- Passenger-related liability issues tied to emergency evacuation.

Transit expenditures and revenue, and purchased transportation for emergency events:
- A fare or fee policy for providing transportation services during an emergency/evacuation event.
- Transportation operating revenues for most recent emergency event.
- Contracts with third parties to provide transportation service or additional vehicles for emergency event.
- A contract with a car rental company to provide emergency transportation service.

Assessment of transit needs/coordination:
- Barriers/obstacles for operating transit system in emergency management activities. The barriers/obstacles included not having planned ahead, lack of service, lack of vehicles, lack of operating budget, hours of operation, service boundaries/jurisdiction, funding restrictions, lack of communication facilities, and lack of accessible vehicles.
- Issues encountered during evacuation.

Surveys were emailed to 46 public, private and school transportation agencies within the study area identified through the American Public Transportation Association and each state's DOT and department of education's (DOE) website. Follow-up telephone calls and emails were sent to all the sample agencies during August and September 2009. A total of 24 surveys were returned (52 percent response rate). None of the questions were mandatory. A complete survey questionnaire and results are included in Appendix D. Common areas of concern in the current public transportation service in evacuation for each topic area are discussed in this chapter.

SURVEY FINDINGS

3.1 Transit Services Provided in Rural Areas

The first set of questions identified the types of participating agencies and their geographic service areas. Out of 24 responses, 22 agencies responded to this question. Of the 22 responses,

10 described themselves as school bus systems, nine replied they were public transit agencies, and three respondents fell into the category of "other," which included social service agencies and senior citizen centers. Thirteen of the respondents listed their service area as countywide, including urban, semi-urban, and rural areas. Five noted they were both city and countywide, two described their jurisdiction as school bus/college/university service, and four agencies responded with "other." Services of the other category responses were limited to their designated school districts, rural areas or only intercity service.

During routine travel service, only 13 of the responding agencies described their delivery as a fixed route. Demand-response service was provided by 12 respondents during routine times. In an emergency event, agencies became more flexible in their transit delivery, with 12 providing demand-response service and only three continuing with a fixed route. However, route and/or point deviation occurred for more agencies during routine travel service (5) than during an emergency (1) (Figure 2).
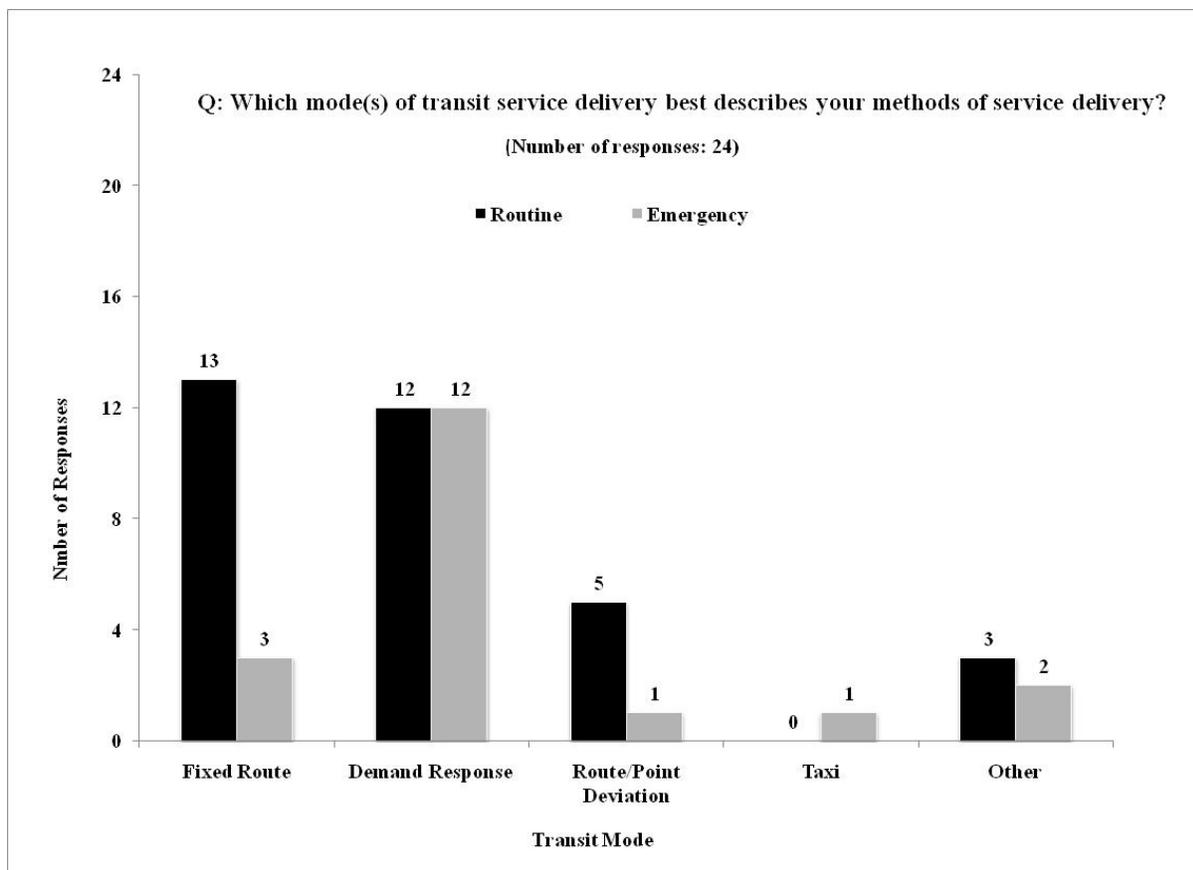
Figure 2. Transit Service Delivery

The survey revealed that a small number of volunteers were utilized to assist in transportation needs during an emergency event, with no more than five agencies (out of 21) responding that they employed volunteer effort. Additionally, only one responding agency reported providing reimbursement of mileage or auto expenses to clients, families or friends who provide transportation during an emergency. This could be an indication of a lack of information provided to the public on the benefits of assisting during an evacuation event. Only four agencies

provided information and referral about the community transportation resources. However, in a majority of cases (13), transit service agencies owned vehicles used by staff to assist evacuees.

Passenger assistance levels became more flexible when the transit systems moved from routine operations to emergency events. Higher levels of service were provided in the areas of door-to-door (10) and package assistance (11) from drivers, the provision of personal care attendants (5) or escorts, and permission of passengers to travel with pets (8) during evacuations (Figure 3). However, four school districts indicated that they did not provide any personal passenger assistance in routine service as their primary responsibilities were to provide student transportation services.
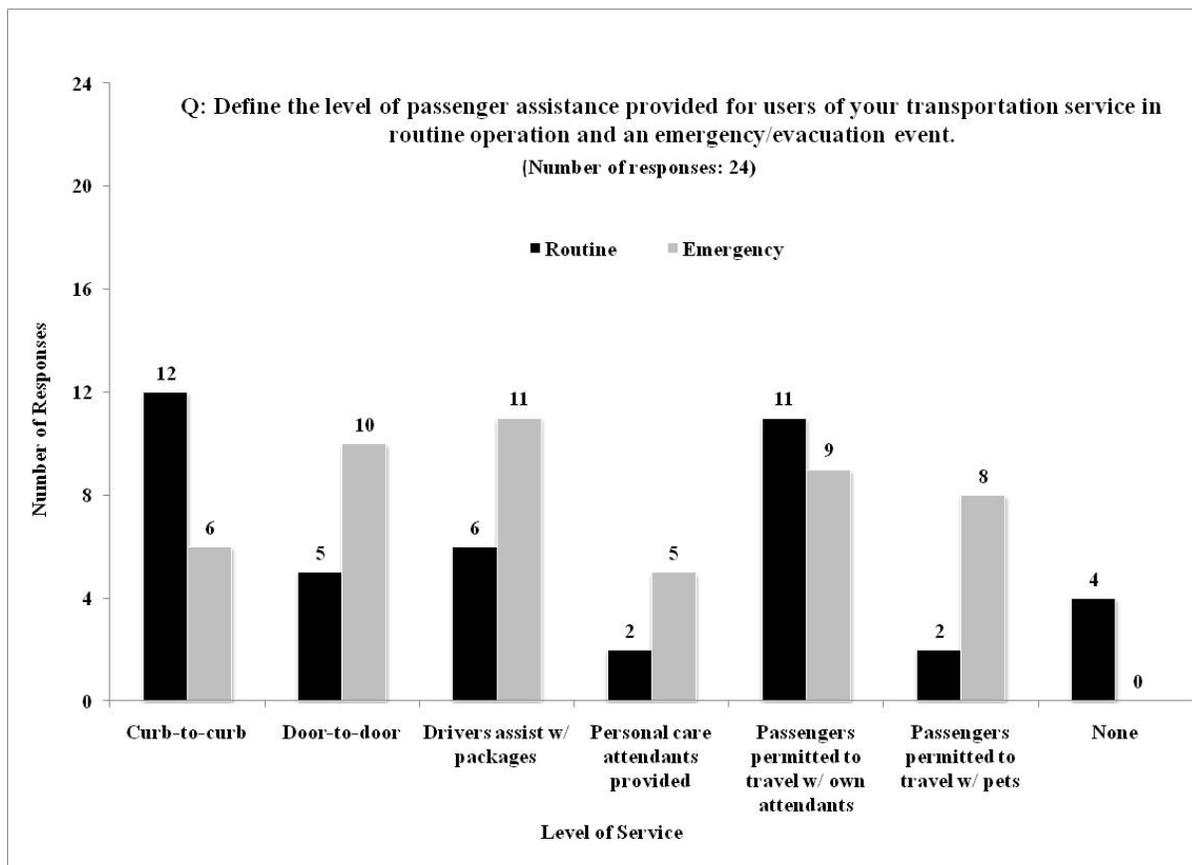
Figure 3. Level of Passenger Assistance

The participants were asked to provide the maximum distances that their vehicles were allowed to travel for an evacuation. Of the 24 responses, two agencies listed 25 to 49 miles as the maximum distance, four responded that 50 to 100 miles is the farthest they would travel, and nine answered that a distance of 100 to 225 miles would be the upper limit. Five of seven respondents that selected "other" noted that they would travel as far as needed to complete the evacuation. The remaining two agencies said their evacuation distance would be limited to their respective counties/parishes only (Figure 4).
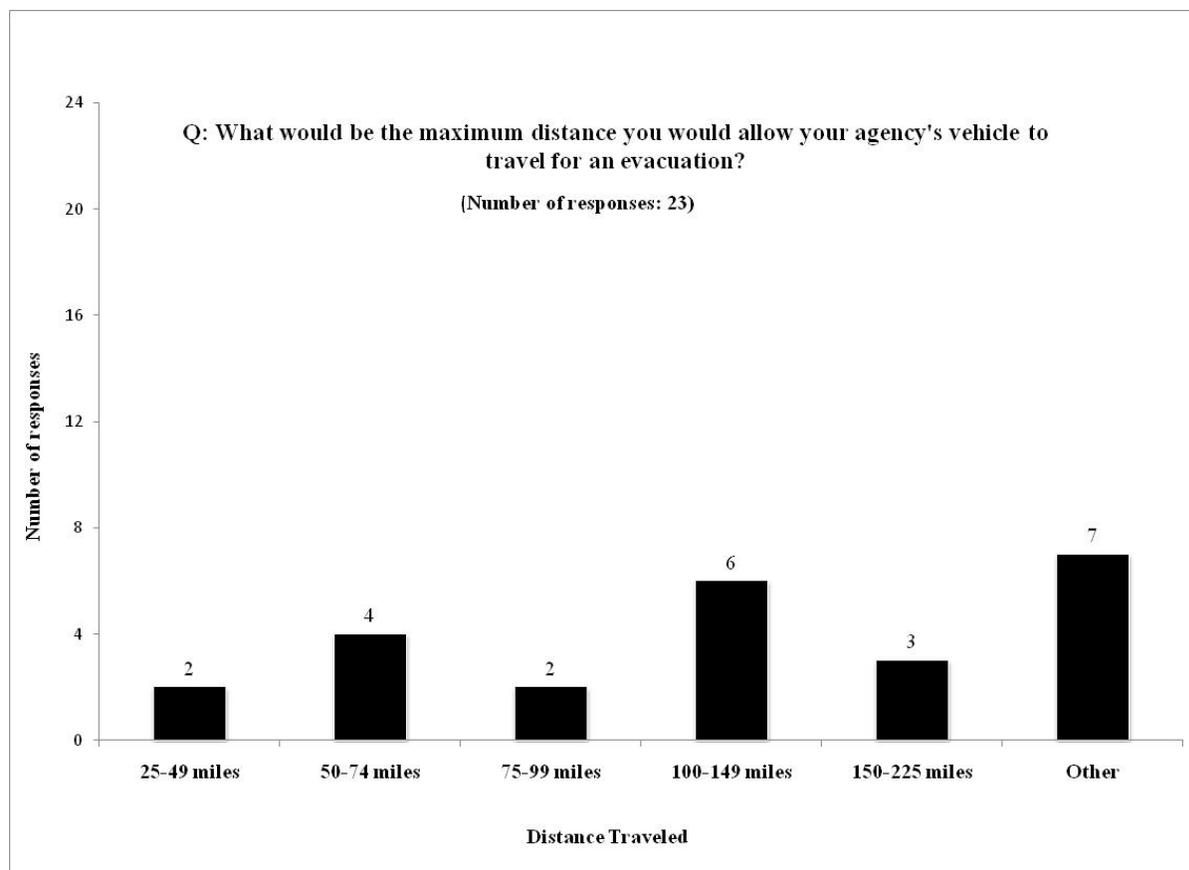
Figure 4. Maximum Travel Distance

Survey participants were asked to provide information about vehicle fleets (cars, sport utility vehicles, minivans, light duty vehicles, bus, etc.) in the transportation services provided by their agencies, including the total passenger capacity, total number of vehicles owned or leased, and total number of wheelchair accessible spots for different types of vehicles.

The overwhelming majority of total passenger seats (approximately 61,640 in 22 agencies) were found on school buses (Table 2). This indicated that school buses could be a very feasible and important mode of transit in an emergency. However, certain issues related to the use of school buses should be noted. Typically, school districts limit those who can ride on school buses to students or staff. This may affect passenger liability if a bus is used for an evacuation event. In addition, the average yellow school bus capacity is between 20 and 76 students. Adults take up significantly more space on a school bus than children and therefore capacity would be reduced in an evacuation. Finally, as compared to transit vehicles, school buses have fewer wheelchair accessible spots (Table 2). Wheelchair accessibility is a very important feature for passengers with disabilities and personal care attendants, and is required in order to comply with the Americans with Disabilities Act.

Table 2. Vehicle Fleet Statistics

Vehicle Type	Total Passenger Capacity (No. of Seats)	Total Number of Vehicles	Total Number of Wheelchair Accessible Spots
a) Cars	599	35	0
b) Sport Utility Vehicles (SUVs)	47	6	1
c) Minivans	470	34	16
d) Standard 15-passenger vans	750	51	21
e) Converted 15-passenger vans (*e.g.*, raised roof, wheelchair lift)	395	59	90
f) Light-duty bus (body-on-chassis type, capacity 16 to 24 passengers)	1,117	61	52
g) Medium-duty bus (body-on-chassis type, capacity over 22 passengers)	1,191	28	35
h) School bus (yellow school bus, capacity between 20 and 76 students	61,640	791	120
i) Medium- or heavy-duty transit bus	840	30	33

Note: Number of Responses: 23

Common areas of concerns:

Limited information had been disseminated to the public on alternate means of transportation. For example,

- Reimbursement of mileage or auto expenses to clients, families, or friends who provide services;
- Volunteer driving options; and
- Transportation through social services such as churches, human resources development councils, and non-profit organizations.

3.2 Communication Systems Used for Transit

A question focusing on communication devices utilized on a daily basis and during emergencies revealed that the majority of agencies (19 out of 24) relied on cellular phones in both instances. A landline telephone system was used by fourteen agencies during an evacuation, and twelve

agencies reported using two-way mobile radios requiring an FCC license in an emergency. Several problems may arise, however, from a reliance on cellular phones and telephones during an evacuation/emergency situation. Network breakdowns can occur, which effectively block cellular communication, and electrical outages may render landlines impracticable. Only one agency reported using a satellite telephone, and it was on a daily basis, not in an emergency event. Satellite phone technology could be a useful, reliable means of communication for transit agencies during an evacuation (Figure 5).
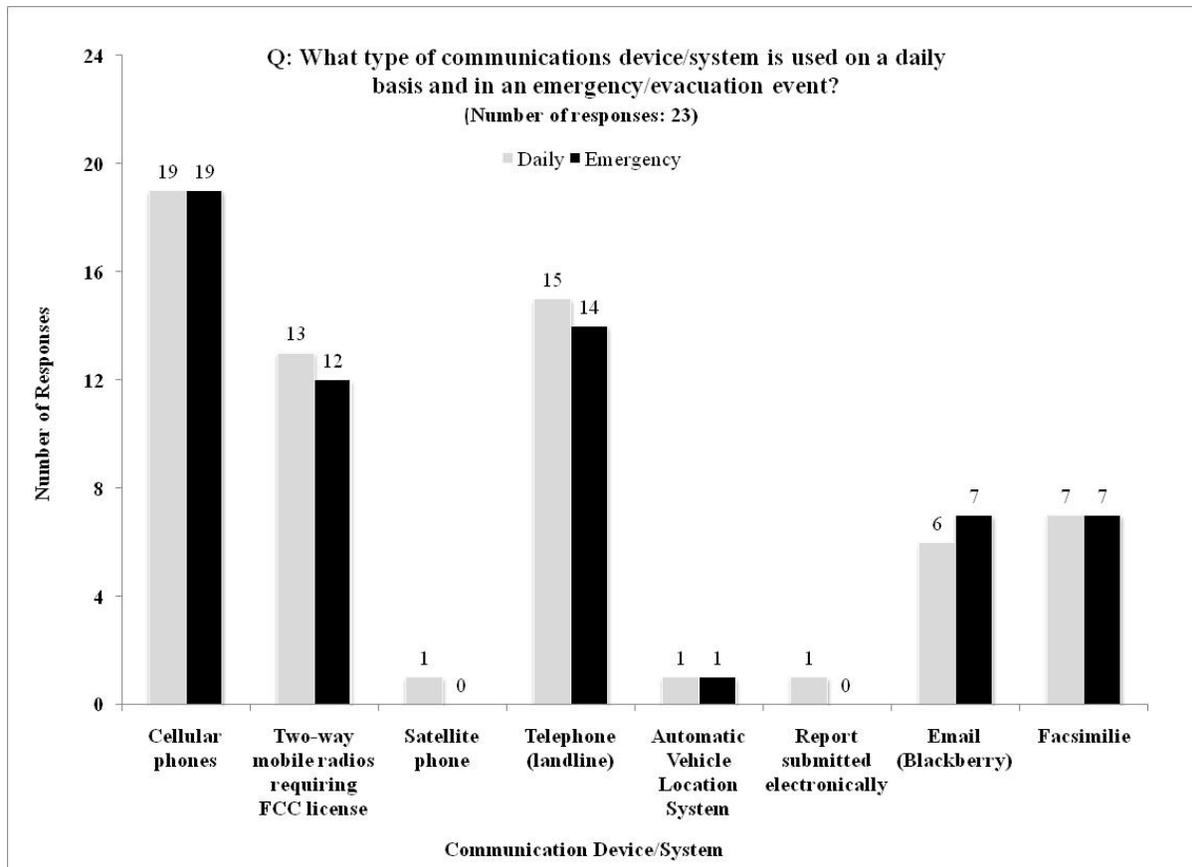
Figure 5. Communication Devices/Systems for Transit Operation

When asked how clients/passengers access transportation services in an emergency, nine (out of 23) agencies responded that they employed individual or social organizations that assist in arranging rides. Eight agencies noted that there were no advance reservation requirements, and seven had a stipulation that clients/customers must make advance reservations. The majority of agencies (11) responded "other." Nine valid responses of the eleven said their clients access transportation through EMAs.

The telephone was the dominant form of information exchange used for riders to make advance reservations, with 11 agencies utilizing it during emergency events. Arrangements made through third parties were used by nine agencies during emergencies. Only one agency reported that calling 311 or 911 was one of the communication modes of choice for riders during routine

transit service, and four agencies employed it during evacuations. These data were encouraging in that they showed that transit users were more aware of transit agencies before an actual emergency occurs, and they were used instead of relying on a last-minute call to 911 or 311. Two agencies reported the existence of an online hurricane registry for use during both routine transit service and emergency events. A suggestion would be to increase the utilization of such registries so that a greater number of riders can prepare in advance for an incoming hurricane event (Figure 6). All of the 19 responding agencies demonstrated their flexibility during an emergency/evacuation event by answering affirmatively that they would accommodate a late reservation or rider with no prior notice if space was available.
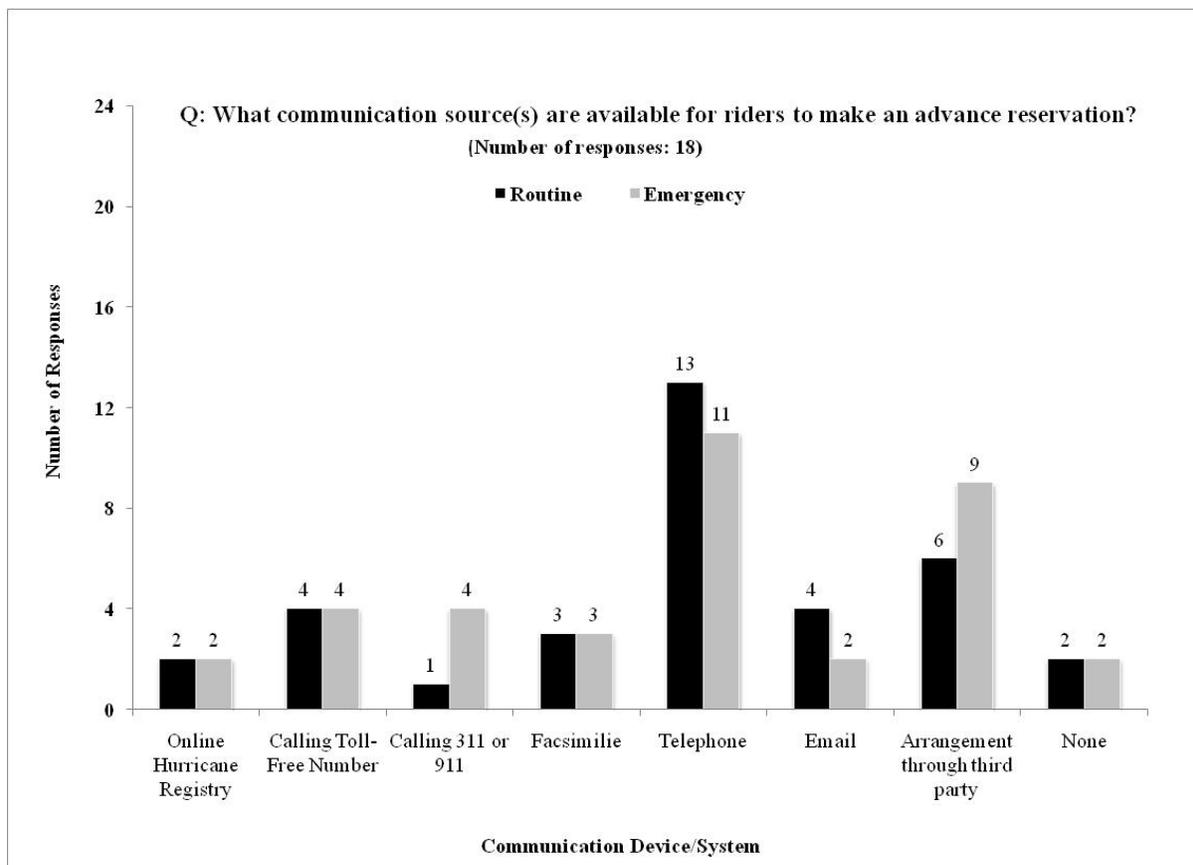
Figure 6. Communication Devices/Systems for Advance Service Reservation

Common areas of concerns:

Transit services had limited or no advanced communication systems for transit operation and service coordination in case of electricity loss or wireless network collapse.

3.3 Ridership information and estimation.

A response from transit service providers on a question about passenger statistics in the most recent evacuation indicated that only 26 riders accessed transit services out of 110 riders who requested the service in the region. This response showed that transit services might not have been needed or used extensively in evacuation, and that evacuees must have been evacuated through other means of transportation. Moreover, some transit services failed to respond to the

service requests of the passengers with wheelchairs who needed assistance during evacuation. However, transit vehicle capacity was not an issue as indicated in Table 2 (Section 3.1), whose data show that a substantial number of transit seats were available in the region.

To estimate ridership for emergency events, a majority of respondents relied on a local emergency management agency's passenger inventory (11 responses) followed by the event-specific service request (nine responses) (Figure 7).
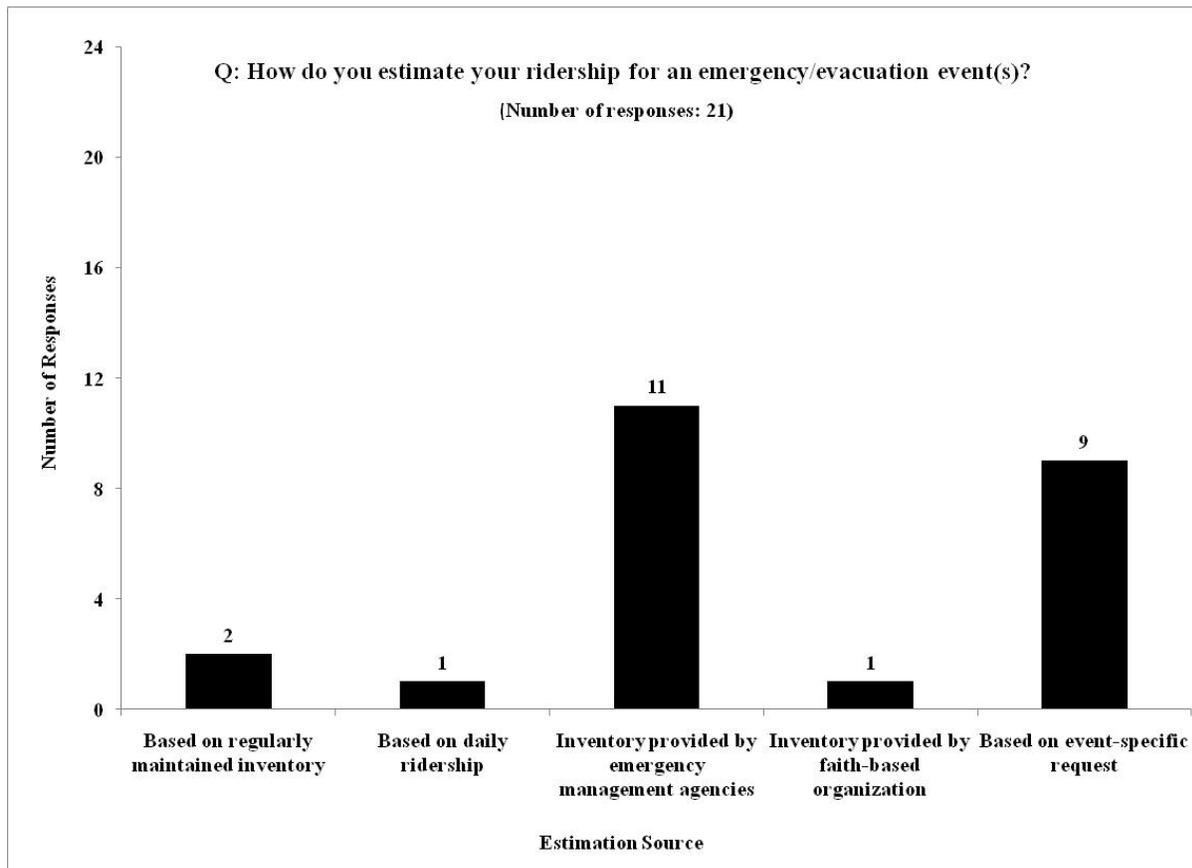
Figure 7. Ridership Estimation Methodologies

Common areas of concerns:

There are no concrete methodologies to estimate the ridership requests that are most needed for transit operation and service planning.

3.4 Emergency Event Issues

All of the 22 respondents stated that their agencies had an Emergency Operation Plan. The majority of agencies had planned for (in corresponding order) hurricanes, explosions/terrorism, severe storms and tornadoes. Few responses (one to two agencies each) indicated planning for earthquakes, volcanic interruptions, and levee/dam failures. These emergency events have a small probability of occurrence and therefore most transit plans do not include them (Figure 8). One response in the "other" category indicated that an agency had a plan for "Train Derailments."
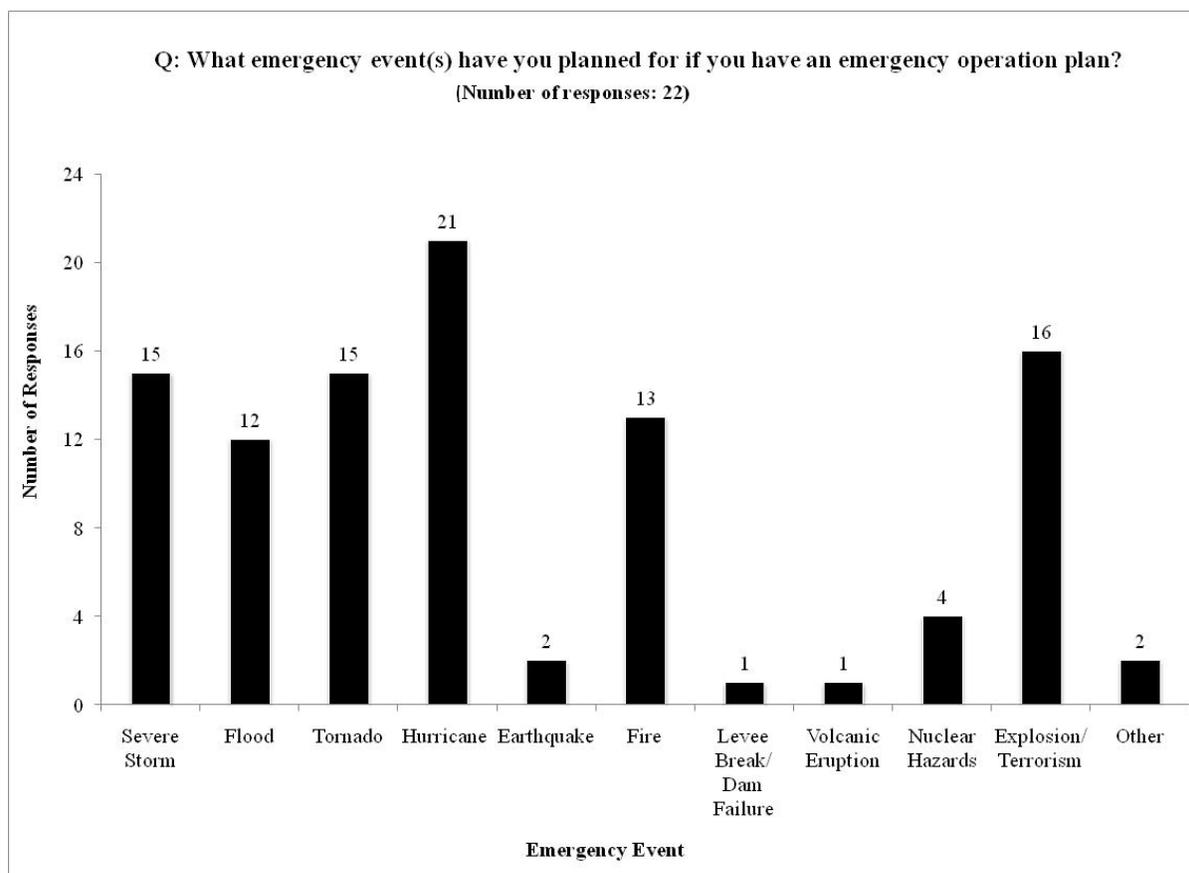
Figure 8. Types of Emergency Events

The survey revealed that 20 (out of 22) agencies were a part of their county or state emergency operation center (EOC). However, only 11 had mutual aid agreements in place with other area transit providers. This indicates that while the majority of agencies had a relationship with the county/state EOCs, they were not acting in coordination with each other during an emergency. Later in the survey, respondents were asked if their agencies had contracts with third parties to provide transportation services or additional vehicles for emergency events. Only four agencies responded yes, while 15 said they had no such contracts.

The survey sought to identify respondents with established communication protocols with other agencies. Twenty-one agencies said that they had such a protocol with a county/state EOC, 14 with a law enforcement agency, 12 with a department of transportation, and eight with the Federal Emergency Management Agency (Figure 9).
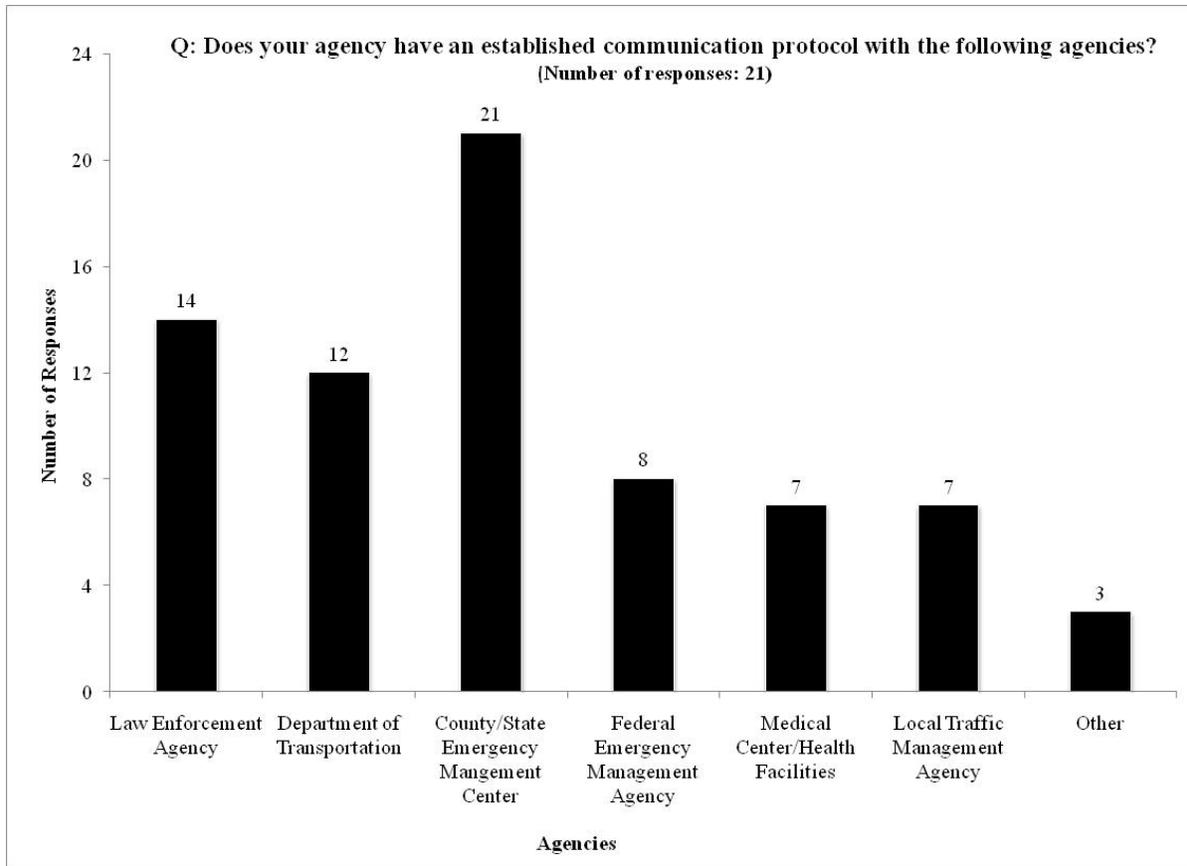
Figure 9. Communication Protocol with Agencies

A small number of agencies published emergency operation plan elements including route maps (2), shelter facilities (5), pick-up points/bus stops (3), and reentry information (1). This leads the researchers to assume that the transit agencies are relying on EMAs to publicize such information.

Eleven of 22 respondents had participated in mock training drills or evacuation preparedness exercises. The majority of the trainings took place before or at the start of the hurricane season (April to September), and eight of the eleven exercises took place within the last two years.

Common areas of concerns:

Although rural public transportation agencies and school bus systems were prepared to provide services to a certain extent, a limited number of agencies had mutual aid agreements specifying who the key players were, what sort of services were requested and required, which agency would bear transit operation expenses, and what area of service jurisdiction was to be covered.

3.5 Employee Issues

In the realm of employee issues, the survey revealed that drivers for the majority of agencies (20) were highly trained in assisting people with disabilities and other medical conditions. In addition, 15 agencies had drivers trained to assist both the elderly and people with hearing and visual

impairments. However, fewer respondents employed drivers trained in assisting people with limited English proficiency (8), and careless residents—people who do not give attention or thoughts to avoiding harm (6) (Figure 10). One response in the "other" category indicated drivers were trained for special needs of students. A second response said drivers were trained in "PASS" (passenger assistance program), "CPR," "Blood-borne Pathogens," and First Aid.
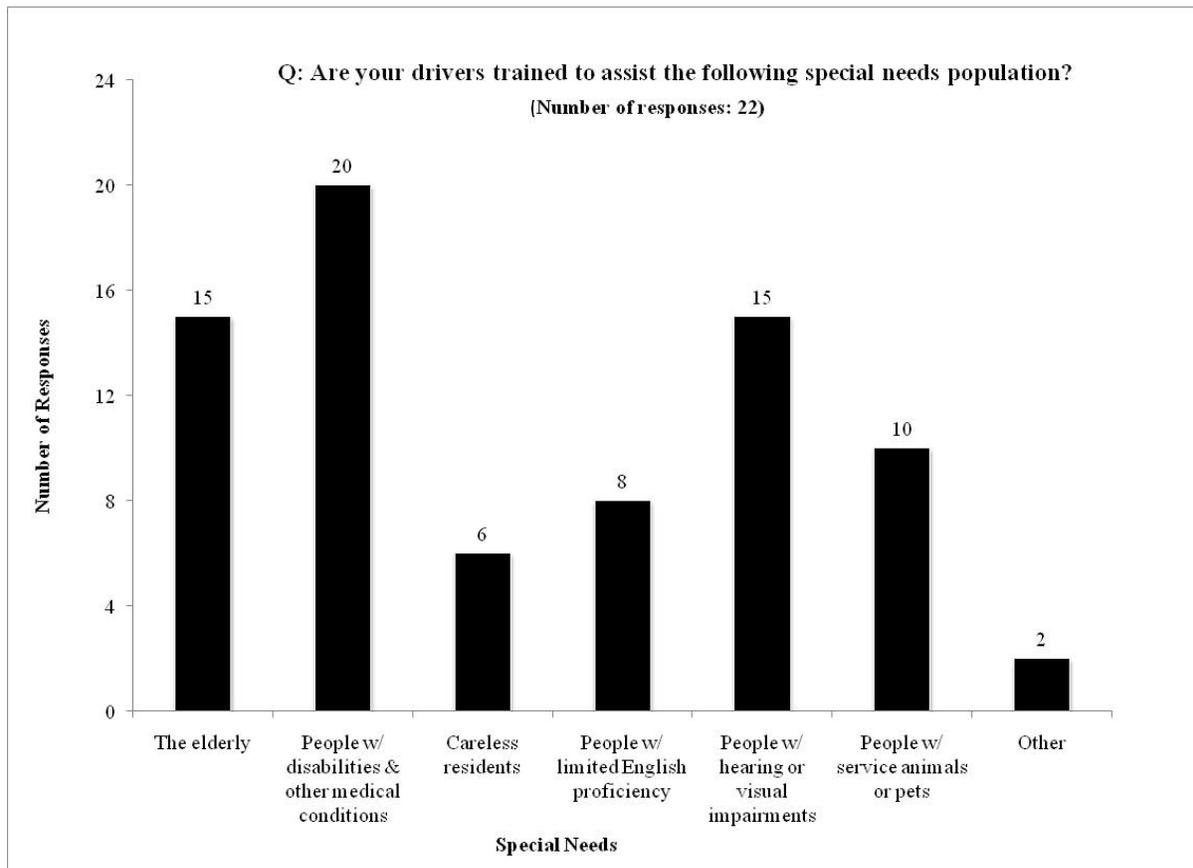
Figure 10. Drivers' Training for Special Need Populations

The majority of responding agencies provided compensation to their employees for working during an emergency/evacuation event, with 18 answering affirmatively. Additionally, 12 agencies provided assistance to the families of employees during evacuation efforts. Arrangements made by transit agencies for families include movement to approved shelters and advance notice and time for employees to assist their families.

A critical issue related to employee staffing was not showing up for work during emergency calls. One question asked for statistics on employees who reported to work during the most recent evacuation call and the responses indicated that more than 50 percent of full-time and part-time drivers did not come to work. This kind of situation may paralyze an emergency evacuation operation (Table 3).

Table 3. Employee Attendance for Most Recent Emergency Call

Employee	Total Employees	Reported to work
1. Transit Director	21	20
2. Transit Dispatcher	16	11
3. Drivers (Full time)	299	149
4. Drivers (Part time)	150	37
5. Mechanics	42	24

Note: Number of Responses: 18

Employee training covered a broad range of topics. Eighteen agencies provided training to their employees on assistance to special needs populations, 12 respondents listed first aid services as a training mandate, and 10 agencies trained their employees in both emergency management and emergency communication. Seven agencies provided training on Incident Command System Management. Only one respondent listed reverse-lane driving as a training topic. This could be due to the fact that most roads in rural areas are two-lane, and so they might not employ contra-flow measures during evacuations (Figure 11).
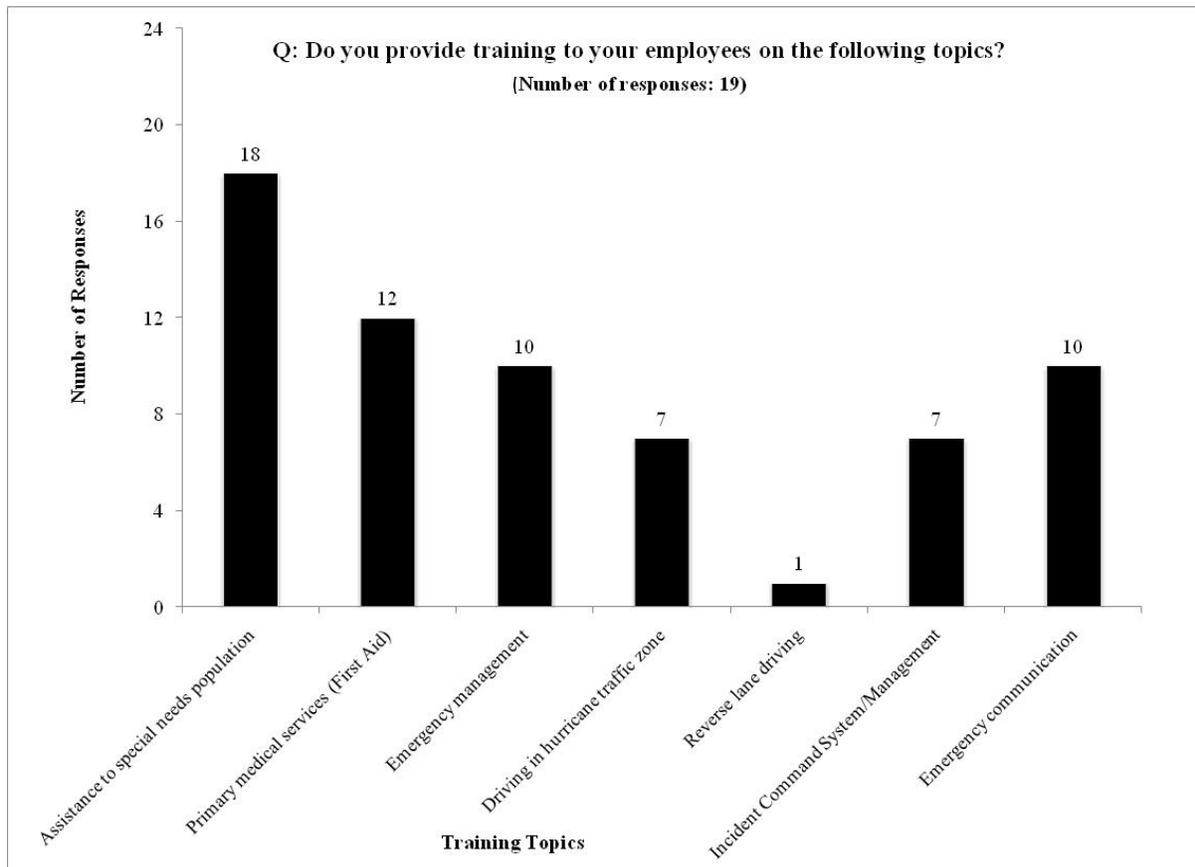
Figure 11. Employee Training Topics

Common areas of concerns:

Transit services faced the following employee related issues:

1. Only a limited number of transit employees were trained in assisting people with limited English proficiency, careless residents, driving in hurricane traffic zone, reverse-lane driving, incident command system management, or emergency communications.
2. Transit services had difficulties in conveying an evacuation work order to non-duty employees, evacuating employees' families, and communicating with employees to return to work once the emergency was over.

3.6 Evacuation Preparation

In terms of preparation time needed to implement an agency's emergency evacuation plan, 71 percent of respondents (12 out of 17) require less than 12 hours. Three agencies need 12 to 24 hours to complete evacuations, and two require more than 24 hours. Television (18) and radio (20) followed by emergency alert system (12), print media (11), and knocking on doors (10) were the highest ranked methods by which evacuation warnings and evacuation-related public information was provided to the public and agencies (Figure 12).
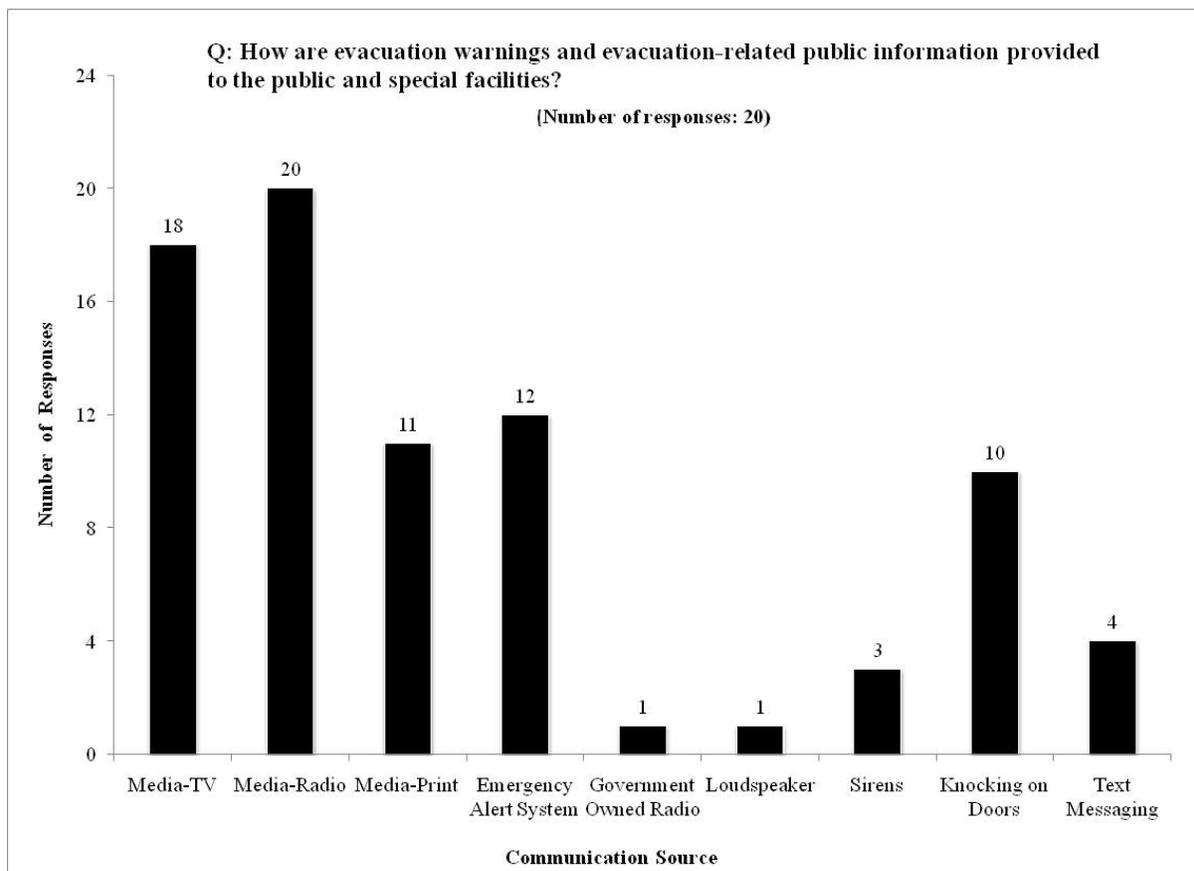
Figure 12. Evacuation Warning and Information Dissemination

A disparity existed between school and public transportation systems on the subject of passenger inventories. Of the 13 agencies that confirmed they had inventories of special-needs passengers in the case of an evacuation, eight were public transit agencies. Six school bus systems responded that they did not keep a passenger inventory, while only one public transportation agency gave a similar response.

The majority of schools and public transit agencies reported having emergency fueling sites, back-up generators, and security plans. Sixteen respondents (out of 21) had a dedicated, accessible and operational fueling site to fuel vehicles in the case of emergency and loss of electricity. The bus maintenance/operation facilities of 12 agencies (out of 20) had back-up generators in case of power loss, and 18 agencies (out of 21) confirmed they had a security plan to protect their transit resources and facilities.

One agency reported facing a passenger-related liability issue tied to emergency evacuation. In this instance, a passenger on the agency's last evacuation was not secured properly in a wheelchair, causing her to fall when the driver turned a curve. The passenger filed suit against the agency. No other agencies reported liability issues.

The majority of respondents did not charge a fare for providing transportation services during an emergency/evacuation event. In an emergency, no public transit providers indicated that fare payment was expected, although three school agencies reported that a fee was levied during evacuations. Additionally, no agencies reported having a contract with a car rental company to provide emergency transportation service.

Common areas of concerns:
1. A few transit agencies had a shortage of critical resources such as backup generators in case of electric power losses, portable fueling stations, and security plans to protect transit resources.
2. Some of the agencies took more than 24 hours to prepare for the evacuations.
3. School buses had to rely on a passenger inventory provided by the EMAs.
4. One of the transit agencies faced a passenger liability issue.

3.7 Transit Expenditure, Revenue, and Purchased Transportation

No responses were obtained to the survey question focused on transportation operating revenues for recent emergency events. There was not sufficient information to interpret this as a lack of information or knowledge, or avoidance of the question. However, a key issue could be that the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) transit funding formulas 5307, 5309, 5311, and 5338 do not have a provision to provide funding for emergency events transportation. This assumption is somewhat supported in responses to the question of barriers/obstacles in Emergency Management Activities—Mitigation, Preparedness, Response, and Recovery.

On a question regarding purchased transportation services or contracting for additional vehicles in emergency events, a majority of agencies reported that they did not need such arrangements (15 responses). However, one agency specifically mentioned that it had a contract to hire five vehicles at a per-mile rate. Another had a contract to receive up to 120 vehicles and it would pay the actual operation cost for the contract. Moreover, none of the agencies indicated they needed vehicles from car rental companies.

Common areas of concerns:

For a national level disaster or evacuation event, FEMA pays for evacuation-related expenses. Nevertheless, local- or state-level emergency incident expenses are borne by the respective

agencies unless the expenses are reimbursed by the local or state EMAs. Rural transit agencies are already under financial constraints that may adversely affect transit operations in emergency events.

3.8 Evacuation Assessment of Needs/Coordination

Transit agencies reported that key barriers for all emergency management activities were the need to plan ahead, lack of operating budget, and funding restrictions to provide services. Lack of service, lack of communication facilities, and lack of vehicles were also concerns for rural transit services (Table 4). The majority of barriers noted were related to preparing for emergency events, followed by mitigating the effects of, responding to, and recovering from such events. The responses of this section reflect the concerns raised in earlier responses in the previous sections such as inadequate finances, lack of advanced communication equipment, and service restrictions.

Table 4. Barriers/Obstacles for Emergency Management Activities

Barriers/ Obstacles	Emergency Management Activities (no. of responses)			
	Mitigation	**Preparedness**	**Response**	**Recovery**
Having to plan ahead	**6**	**5**	**4**	**4**
Lack of service	3	**5**	1	1
Lack of vehicles	1	3	3	2
Lack of operating budget	**7**	**8**	5	**4**
Hours of operation	1	**4**	1	1
Service boundaries/ jurisdiction	0	1	1	0
Do not prefer to mix populations (i.e., disabled with non-disabled)	0	1	0	1
Funding restrictions to provide service	**4**	**4**	**4**	**3**
Lack of communication facilities	2	3	3	2
Lack of wheelchair accessible vehicles	1	2	2	1

Note : Number of Responses: 12

When respondents were asked to note the issues encountered during coordinating efforts for evacuation operations, transit service billing and its payment (four responses) were noted as the foremost issue, followed by driver qualifications (two responses), insurance (one response), and different vehicles (one response).

Common areas of concerns:

Planning and policy aspects such as not planning ahead, lack of service, funding restrictions to provide services; and capital aspects such as lack of vehicles, wheelchair-accessible vehicles, or communication facilities are matters of concern for transit agencies related to emergency management planning and operation activities.

4. BEST MANAGEMENT PRACTICES

Through the survey findings and literature review, a set of best evacuation management practices were developed to improve current evacuation planning and operation practices. The best management practices (BMPs) are grouped in two sections: (1) for public transportation agencies and school buses, and (2) for emergency management agencies. The BMPs follow the common areas of concern listed for each category of the survey findings:

(1) For Public Transportation Agencies and School Buses

Prepare Ridership Information Dissemination Plan in conjunction with a local emergency management agency. This plan should include the available transportation options, evacuation schedule, contact information, contact methodology, and services provided by transit services.

- Equip transit agencies with the following:
  - Advanced communication systems such as satellite phones and a standalone portable communication system, such as the Mobile Communication Briefcase developed by the Western Transportation Institute. For more information, visit http://www.westerntransportationinstitute.org;
  - Portable fueling stations;
  - Portable electric generators; and
  - Updated passenger inventories.

- Coordinate with a local EMA to develop mutual aid agreements with other transit agencies, law enforcement agencies, DOTs, and first/emergency responders. This mutual aid agreement should clarify roles and responsibilities, liability issues, operation costs and reimbursement, resources sharing, level of passenger assistance, etc.

- Incorporate emergency management training into the regular and ongoing staff training program. The training program should include the National Incident Management Systems (NIMS), Incident Command System (ICS), Emergency Communication System, First Aid, Assistance to Special Needs Population, Reverse-Lane Driving, Driving in Hurricane Traffic Zone, Serving People with Limited English Proficiency, and Serving People with Service Animals or Pets.

- Revise employment policies with the following provisions:
  - Prepare a plan to assist staff members' families in emergency events;
  - Establish emergency call notification plan;
  - Provide temporary housing for displaced employees so they can return to work quickly;
  - Compensate employees for serving in emergency;
  - Clarify employee roles and responsibilities; and
  - Obtain emergency service/prior pledge forms signed by employees.

- Conduct mock operation drills prior to each hurricane season.

- Obtain insurance coverage to serve in emergencies if the current provision does not cover emergency services.

- Update a plan to protect critical resources. The plan may include provisions of covered parking space in a no-flood zone, splitting vehicle fleets to keep at two or more locations, and portable fueling systems.

(2) For Emergency Management Agencies

- Include "Rural Transit Services" and "School Bus System" in the local emergency management plan.

- Provide financial assistance to transit agencies and school bus systems to allow them to equip their agencies with the advanced communication systems, fueling facilities, electric generators, and to insure agencies while serving in emergency events.

- Create a regional training program for transit agencies and school bus system employees. This training program should include the NIMS, ICM, Emergency Communication System, First Aid, Assistance to Special Needs Population, Reverse-Lane Driving, and Driving in Hurricane Traffic Zone.

- Lead mutual aid agreement efforts with transit agencies, school bus systems, law enforcement agencies, DOTs, and DOEs.

- Evaluate the current emergency management plan for transit services' role and performance.

- Update a passenger inventory on a regular basis and exchange with associated transit service providers and school bus systems.

5. CONCLUSION, RECOMMENDATIONS, AND FUTURE RESEARCH NEEDS

The objective of this study was to evaluate the emergency preparedness of public transportation in selected rural coastal communities in the NGM. To provide some context for this evaluation, the study began with a review of available literature on the role of transit in emergency evacuation. Issues, concerns, recommendations, and best management practices are discussed in several research reports and articles for the purpose of improving transit operation during emergency events. Some recommendations that have been put forth in these various materials include improving coordination among agencies, conducting regular mock-disaster drills, increasing participation of citizens and transit, and establishing mutual aid agreements. Many of these activities are incorporated into current rural evacuation practices in the NGM, as they were identified in this study in a survey of practices and other emergency response issues conducted across transit and school bus systems in the study area. Experiences during hurricanes Katrina and Rita may have impacted and had a lasting influence on emergency preparedness in the NGM area. Transit agencies also demonstrated capabilities to provide emergency services to their respective service jurisdiction in the wake of hurricanes, severe storms, explosion/terrorist events, floods, tornados, etc. The capabilities include increasing level of passenger assistance, and flexibility in service scheduling, delivery, and jurisdiction. A total passenger capacity of 67,409 (including 368 wheelchair-accessible spots) and 1095 vehicles (including cars, SUVs, minivans, passenger vans, light and medium duty buses, school buses, etc.) provide more confidence in the capabilities of transit systems in the region to handle emergency evacuation operations. However, certain major shortfalls have been identified in the areas of communication, employee issues, and financing, as summarized below.

(1) Communication

A majority of transit agencies indicated they had adequate communication devices/resources for emergency operations, advance reservations, and coordination with a lead agency. However, there is a gap in disseminating information between agencies and transit users. The information may include evacuation route maps, shelter facilities, types of transportation services available, pick-up points/bus stops, and reentry schedules/services. Transit agencies generally relied on the local EMAs to disseminate this information. However, compared to EMAs, transit agencies can provide information more effectively because they routinely deal with passengers, their travel requirements, and destinations. Furthermore, only four agencies provided information and referrals about the community transportation resources available to residents during an evacuation.

In addition to institutional issues, technical issues such as sparse communication network coverage in rural areas or network breakdown during an evacuation operation due to conditions such as flood, rain, wind, power outages, large geographical area, or dense vegetation play a critical role in the coordination of emergency operations. Use of satellite phone technology, a mobile communication briefcase and reliable passenger information would be a useful, reliable, effective and efficient way for transit agencies to enhance and ensure information dissemination.

(2) Employee Issues

Transit employees are the most valuable assets for agencies during an evacuation operation. One of the most critical issues identified among surveyed agencies was that more than 50 percent of

employees did not report to work on the last evacuation call. This issue was most prevalent within the largest segment of the transit agency workforce—its drivers. Drivers are responsible for carrying out routine and evacuation transit operations. An issue that prevented employees from reporting for work was concern for the safety of themselves and their families. Transit agencies attempted to address this issue by offering compensation to employees, sheltering families at secured facilities, and giving notice and time to prepare for the needs of their families. Note that agencies also faced a more fundamental problem in simply establishing communication with employees for post-emergency event operations.

Employee roles and responsibilities in emergency events should be well defined in the job description, and reinforced with essential job training. A "prior commitment" form clarifying expectations could be signed by employees during the hiring process, along with notification of defined emergency assistance benefits for serving in emergency events. Some of the agencies did not train their employees in areas that would enhance transit services in rural areas, such as:

- Serving People with Limited English Proficiency;

- Serving People with Service Animals or Pets;

- Incident Command System Management;

- Emergency Communication; and

- Driving in Hurricane Traffic Zones.

(3) Inadequate Finances

Funding for evacuation-related operations and capital expenses for transit was the most significant and frequently cited concern related to emergency planning. Transit agencies indicated this was an issue in three different categories of the survey: (1) Employee issues—lack of budget for compensation or overtime; (2) Transit Revenue and Expenditure; (3) Assessment of Needs/Coordination—barriers/obstacles. Transit agencies reported that they were having issues with lack of operating budgets, restricted funding, and billing and payment as barriers/obstacles for providing emergency services.

In the reauthorization of the SAFETEA-LU, it is suggested that Congress recognize the funding issues related to evacuation operations and authorize the FTA or FEMA to reimburse transit evacuation expenses including operation, training, and preparation. Reimbursement may be extended to purchase communication devices and ITS equipment to enhance evacuation operation capabilities. States can leverage taxes on flood and natural disaster insurance policies to fund emergency management activities.

Many of the issues identified by transit agencies are also a concern for school bus systems. School bus systems are a critical resource because they are safe, reliable and readily available for rural evacuation operations. However, the following advantages and disadvantages of using school buses should be considered during emergency management planning:

(1) Advantages:

- School bus systems routinely deal with issues such as altered bus schedules, traffic congestion, and weather conditions.

- Bus drivers, operational equipment, and buses are ready to perform multiple tasks in emergency events.

- In many instances, schools are being used as shelters; therefore, it would be more convenient for school bus systems to coordinate an evacuation operation.

- School buses are painted yellow, which would be beneficial for law enforcement agencies in giving them priority consideration in traffic and for passengers to identify their evacuation vehicle.

- Useful school district resources such as school nurses, safety officers, coordinators, and mechanics could be available to supplement emergency operation personnel.

(2) Disadvantages:

- Compared to public transportation buses, school buses have limited wheelchair-accessible spots.

- School buses are not equipped with air conditioning, which may cause inconvenience for some passengers.

- School buses have to rely on local EMAs for passenger information, maps, and directions to pick-up locations and shelters.

- If school bus systems are not incorporated into a local emergency management plan, their utilization and response time during an emergency may be significantly delayed.

- The regular school bus capacity is between 20 and 76 students. Adults take up significantly more space on a school bus than children and, therefore, capacity would be considerably reduced in evacuation.

- School buses may be at greater risk of exposure to litigation for inconvenient service during an evacuation.

Future Research Needs:

Rural transit agencies are already facing financial crises. Adding the burden of providing emergency evacuation services may make transit services even more financially unstable. A transportation financial management manual that provides examples and suggestions for successful practices would be a valuable document to help agencies address financial issues such as operating expenses, expense reimbursement, billing and payment mechanisms, insurance, how to purchase transit services, and how to lease transit services, etc.

Also, current research and completed research projects focused on the elderly, people with disabilities and other medical conditions, careless residents, people with limited English proficiency, people with hearing or visual impairments, and people with service animals. Children are literally being left behind and have not been the focus of studies. As children are a vulnerable population, they often have unique routine, survival, transportation, and medical needs that require special planning by families, local emergency management agencies, health care facilities, etc. Coastal communities along the I-10 corridor from Florida to Louisiana are predominantly rural in nature. In these communities, 27 percent of children live in poverty and may be exposed to a higher level of risk (Appendix E). It is extremely important to conduct a comprehensive evaluation of the transportation needs of children in relation to the mitigation,

preparedness, response, and recovery from disasters in order to provide a framework for childcare facilities, hospitals, schools, and emergency management and law enforcement agencies to prepare appropriate disaster management plans and to improve current practices for evacuating children.

APPENDICES

Appendix A: Study Area Map
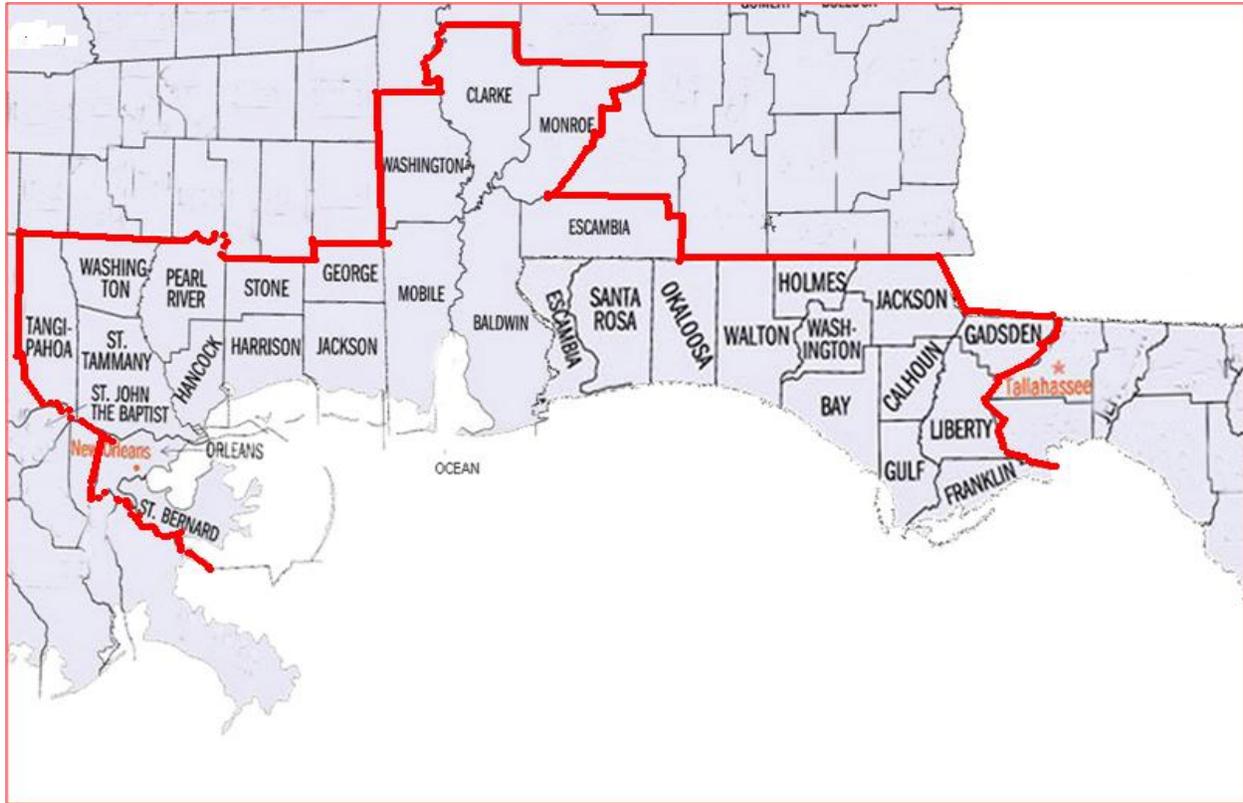
Appendix B: Study Area

This research project covered the 24 counties of Mississippi, Alabama, Florida and four parishes of Louisiana. The estimated urban and rural population of each of these counties in 2009 is shown in Table 5.

Table 5. Study Area Counties and Parishes with Population—2009

Counties	Urban Population	Rural Population
LOUISIANA PARISHES		
Tangipahoa Parish	46%	54%
Washington Parish	38%	62%
St. John the Baptist Parish	86%	15%
St. Tammany Parish	75%	25%
MISSISSIPPI COUNTIES		
George County	0%	100%
Stone County	21%	79%
Pearl River County	30%	70%
Hancock County	62%	39%
Harrison County	78%	22%
Jackson County	68%	32%
ALABAMA COUNTIES		
Washington County	0%	100%
Clarke County	26%	74%
Monroe County	22%	79%
Escambia County	39%	61%
Mobile County	79%	21%
Baldwin County	45%	55%
FLORIDA COUNTIES		
Holmes County	21%	79%
Jackson County	17%	83%
Washington County	17%	83%
Calhoun County	35%	66%
Liberty County	0%	100%
Gadsden County	34%	66%
Gulf County	33%	67%
Bay County	89%	11%
Walton County	21%	80%
Santa Rosa County	71%	29%
Okaloosa County	90%	11%
Escambia County	89%	11%

Source: Economic Development Intelligence System

Appendix C: Emergency Response Case Study of Sacramento Region

[This case study was done by the Sacramento Council of Governments under the Rural-Urban Connections Strategy project. It can be found at http://www.sacog.org/rucs/wiki/index.php/Emergency_Response.]

The Greater Sacramento Region's Natural Disaster Risk

The Sacramento region faces a number of potential emergency situations caused by events such as forest fires, flooding and earthquakes. Forest fires are a significant risk to foothill areas (for example, Placerville and Auburn) as seen in the summer of 2008 when California experienced a record number of forest fires. Although earthquakes are not considered a serious threat because the Sacramento region is not along the most active fault lines, some geologists do believe California is overdue for a large earthquake that could potentially affect Sacramento. In addition, many parts of the region have a high risk of flooding due to large rivers, vulnerable levees and developed flood plains.

The Sacramento region remains the most at-risk large metropolitan area in the United States for a major flood event. Large rivers and significant creeks flank or divide nearly all the counties in the region. Due to the numerous natural bodies of water, many parts of Sacramento, Sutter, Yolo, and Yuba counties are in 100-year flood plains. In order to protect residents from flooding, hundreds of miles of levees have been built, but many are currently not up to federal protection standards. Compounding the region's vulnerability to flooding events is the remote threat of dam failure; two large and several smaller dams hold back water north and east of Sacramento.

The Rural Challenges

Natural emergencies create challenges that affect Sacramento's urban and rural areas in different ways, and both have different barriers to evacuation. Disaster preparedness efforts have focused on urban areas because there are more people and infrastructure. However, rural areas face more frequent threats from natural disasters, such as fires and floods.

Rural areas face unique vulnerabilities due to their very nature. Expansive wooded and vegetative areas are significantly more vulnerable to fires. The California fires in 2008 burned nearly 300,000 acres of land and numerous homes, affecting rural areas in a far larger proportion than urban areas.[1] Locally, Placer County and Yuba County had significant fires, with over 1000 acres burned. Additionally, rural infrastructure is frequently more vulnerable to flood events. Historically, many rural and county roads were not constructed with an engineered pavement section. Many of the roads we see today are composed primarily of dirt and gravel, leaving rural roads particularly suspect

to washing out during major floods. The impacts of fires that clear out vegetation coupled with heavy rains can create flash floods and/or mudslides which are capable of wreaking havoc on rural roads and communities. Many homes and property are along rivers and creeks, leaving them vulnerable to levee breaches during major storms. What is more, rural areas lack the emergency services and relatively quick response times that urban areas have, which can compound a small incident into a larger problem.

Emergency Preparedness Planning

The threat of natural (as well as man-made) emergencies establishes the need for good emergency planning in both urban and rural areas. In the SACOG region, urban and rural boundaries are so close to each other that they are inextricably related. It is important that both urban and rural areas are well prepared in the event of an emergency. In fact, rural roads may be an urban resident's natural escape route.

In California, every jurisdiction has emergency planners that follow an organization system in order to control chaos and save lives during an emergency. The following are systems used:

- National Incident Management System (NIMS) is the national structure for command, control and communications among responding agencies and decision makers. NIMS was created after September 11, 2001 and is based on the California model.
- California Standardized Emergency Management System (SEMS) is a state-wide system directed by the California Office of Emergency Services, which consists of multi-interagency coordination and mutual aid. SEMS was created after the 1991 East Bay Hills fire.
- Incident Command System (ICS) is a local, emergency-site system used by first responders that helps to direct and delegate authority, used in small traffic accidents and major catastrophes.

Throughout California, emergency planners implement the systems previously mentioned, depending on the situation, as a way to control and communicate during an emergency. The following are local emergency planning sites:

Office of Emergency Services (OES) is in every county and many cities in California and oversees day to day emergency planning.

Emergency Operations Center (EOC) is a command center where emergency service providers (many from the local OES) meet and coordinate response, recovery, and resources during disasters.

Mobility and The Role of Transit

In the event of an emergency, residents must be able to evacuate their homes and go to a safer area (such as higher ground in the case of a flood). Unfortunately, some people are at risk of being left behind, such as people in convalescent/nursing homes or hospitals, seniors unable to drive and people that do not have a car. In 2000, over 54,000 households in the Sacramento region did not have a vehicle, 2400 of which were in rural areas. People unable to drive may have friends or family that can transport them, but some may depend on alternative transportation.

Transit plays an important role during an emergency. In evacuation situations, buses offer a vital service by moving large numbers of people to safer areas. Additionally, transit vehicles provide the opportunity to transport emergency responders and necessities (food, blankets, etc.) to disaster sites and to provide mobile cooling stations for fire fighters.

Case Study (1997)

The second largest evacuation in U.S. history took place in Yuba and Sutter Counties on January 1, 1997. After a massive snowfall before Christmas, followed by warm, heavy rain, all the major northern and central California reservoirs exceeded flood control capacity. By New Years Day voluntary evacuations were ordered for the urban areas in both counties.

However, Yuba-Sutter Transit was not notified or given evacuation orders by either county EOC. It was simply by happenstance that one transit analyst found out about the order, and she spent over three hours attempting to contact the responsible emergency services official in either county. During this time, the analyst contacted Laidlaw Transit Services, Inc., an agency contracted to Yuba-Sutter Transit for operations and maintenance services, which began preparing the transit systems for activation. Finally, an emergency official instructed the transit analyst to assist the local ambulance company in the evacuation of all the nursing facilities, convalescent hospitals and group homes in both counties. Yuba-Sutter Transit split the number of buses in each county so that, in the event one flooded, half of the fleet would still be available. Yuba-Sutter Transit took the evacuees to schools and community centers in Nevada and Plumas Counties, which were ill prepared for the number of people and their frail state. With the help of bus drivers and volunteers, over 1000 individuals were evacuated on busses that day.

The Yuba-Sutter Transit evacuation experience provides several valuable insights into challenges faced by the rural transit operator. To begin with, Yuba-Sutter Transit did not have an open communication with the local OES. It was by sheer tenacity that the transit analyst got in contact

with the emergency planner, when the emergency planning agencies in both Yuba and Sutter Counties could have been in contact with the transit agency. Second, transit's role in emergencies was not pre-established. Had OES officials and the transit operator been in regular contact, the transit agency could have started evacuations hours earlier and the (very expensive) joint effort with local ambulance companies could have been avoided. Finally, transit operators were not included in the jurisdiction's emergency planning. By planning with transit operators, OES officials could have known what transit inventory was available, how to access the inventory and how best to get in contact with the transit operators in order to facilitate effective and efficient evacuations.

Case Study (2007)

In October 2007, the Department of Homeland Security funded an emergency response exercise that simulated a flood disaster in the Sacramento Region. The exercise[2] involved ten transit providers[3] and several agencies[4] in the region. The simulation examined how transit resources and abilities could be used to deal with various aspects of a flood emergency, including a levee break. The emergency response exercise tested the following areas: interaction between transit agencies and EOCs, coordination among transit operators, EOC communications of local transit aspects of city and county evacuation plans, and operational aspects of a mass evacuation.[5] The exercise was very beneficial in identifying areas where the teams did well: leadership in local transit agencies, resource response at the Sacramento City and County EOC, and communications and plans within each local agency. However, the exercise also highlighted several areas for improvement.

According to the emergency response exercise After Action Report (AAR), improvement is needed between EOC personnel and transit agencies in these areas:

> Communication—broke down because the EOC and transit agency communication plan was incomplete and inaccurate, resulting in delayed operational decisions and inaccurate resource tracking.
>
> Leadership—lacked within the EOC because there was not a primary transit representative, which created a "break-down in communication of emergency operation information."
>
> Training—among transit operators on the procedures and resources of the EOC system, limiting the operator's capabilities to effectively assist the EOC.

The Sacramento region has had two emergency exercises over 10 years—one real and one simulated. The 1997 flood evacuation and the 2007 emergency exercise demonstrated positive aspects in our region and yielded several areas for improvement. Both examples established the need for transit agencies and EOCs to have better communication, leadership and training. Many improvements

have been made after the 1997 experience, including establishing frequent communications between the transit operator and emergency planning agencies. However, the 2007 exercise highlighted the fact that the region still has many improvements to make in these areas.

Opportunities and Innovations

In response to the transit emergency exercise, SACOG applied for and received a Caltrans grant to create a plan that will concentrate on the recommendations of the After Action Report (AAR). This plan[6] is designed to be a continuous effort to improve emergency-related communication, procedures and information within transit agencies and, when applicable, with local EOCs. The AAR response plan will also study flooding effects on transit systems in the Sacramento River and American River Flood Plains, including rural sections of Sacramento and Yolo Counties. Agencies that participated in the October 2007 exercise will be invited to participate in this exercise, which will be overseen by the Transit Coordinating Committee (TCC), a SACOG advisory group. This innovative and important plan will better prepare the region in the event of an emergency.

SACOG is also working with partner agencies to implement an Intelligent Transportation System (ITS) project called the Sacramento Transportation Area Network (STARNET) system. Many difficulties during emergencies are encountered when information is not accurate for first responders, emergency planners and incident commanders. Transit operators and emergency responders will be able to use STARNET to exchange information and coordinate operations in the Sacramento region. STARNET will allow real-time sharing of data and live video, as well as adjustment of joint procedures pertaining to roadways and public transit operation, and public safety activities. It will also provide more information for travelers via the region's 511 web site and interactive telephone service (dial 511).

Through the TCC, SACOG is exploring an opportunity to create a formal framework between transit operators and emergency planners. The framework may identify, establish, and standardize information sharing between transit agencies and EOCs. Improving communications and leadership between the agencies and training within transit agencies could also be addressed. SACOG is interested in working with the TCC and other partners to identify innovations and opportunities to address the AAR recommendations.

Funding

Many transit operators are not in a position to fund emergency planning exercises and programs, especially given the current fiscal environment. Transit costs (such as operations and maintenance)

require considerable funding commitments, and transit operators are increasingly short of funds. Federal and state funding support has declined over the last several years and transit operators have turned to more volatile local sales tax for funding. The limited resource makes shifting discretionary monies away from operations to emergency planning nearly impossible. In order to pay for exercise planning and training, transit operators have to rely on grants and other governmental sources. Some opportunities include:

> The California Office of Emergency Services provides training classes on the various organization systems.
> The United States Department of Transportation and the Federal Transit Administration provide classroom training and online courses on a wide variety of topics ranging from ICS and NIMS to terrorism awareness.
> The U.S. Department of Homeland Security and the California Office of Homeland Security provide several grant programs.

The 2005 Hurricane Katrina flood disaster brought to light Sacramento's vulnerable levees and ranked our region as a national concern for serious flooding. The ensuing years have led to increased funding to improve the region's levees in many of our at-risk areas. In 2006, the California Legislature passed Proposition 1E, the Disaster Preparedness and Flood Prevention Bond Act, which allocated $4.06 billion to rebuild and repair California's most vulnerable flood control structures. Also in 2006, the public passed Proposition 84, which provides renewed funding for the Flood Protection Corridor Program (FPCP) in the amount of $40 billion. Most of the funding goes to improve the region's levees.

In spite of the state-wide funding increases, the Sacramento region still needs to expand safety improvements and emergency planning efforts. As part of the Rural Urban Connections Strategy (RUCS) project, SACOG would like to explore the issues identified above in greater detail by answering the following questions:

> What other transportation aspects of emergency planning affect rural areas?
> How can transit be incorporated more fully into emergency planning?
> What additional lessons can be learned from the 1997 and 2007 case studies?
> What are some of the most cost-effective strategies to enhance regional preparedness?

SACOG plans to continue working with regional partners to identify new innovations and pursue new funding opportunities.

Footnotes

1 California Department of Forestry and Fire http://www.fire.ca.gov/index_incidents_info.php

2 Sacramento Functional/Full-Scale Exercise (FE/FSE)

3 Sacramento Regional Transit, Paratransit, Inc., Placer County Transit, Yolo County Transportation, El Dorado Transit, Folsom Stage line, Roseville Transit, South County Transit, Amtrak, Fairfield Suisun Transit.

4 California Department of Transportation, Federal Emergency Management Agency, Federal Transit Administration, Natomas Unified School District, Sacramento Area Council of Governments, Sacramento County Office of Emergency Services, US Department of Homeland Security.

5 The exercise was funded by the US Department of Homeland Security and coordinated by the California Office of Homeland Security, SACOG and consulting firm Booz Allen Hamilton. It was an exercise that took place at the Sacramento County Emergency Operations Center and the Natomas Unified School District Headquarters. An After Action Report was developed after the completion of the exercise identifying strengths and weaknesses. The After Action Report is now being used to develop a Caltrans awarded Sacramento Emergency Transit Response Plan. The plan will serve as a template to guide transit operators in the SACOG Region in preparation for disasters.

6 Sacramento Functional / Full Scale Exercise After Action Report Response to Recommendations Plan

Appendix D: Survey Results

Evacuation Preparedness of Public Transportation and School Buses Survey

The Western Transportation Institute (WTI) at Montana State University (MSU), in cooperation with the Center for Urban Rural Interface Studies at Mississippi State University, is conducting this survey of public transportation and school-bus-system providers to assess evacuation practices and mobility of rural residents. Emergency management agencies and other planning organizations need information on your agency's challenges, needs and opportunities. Your input is very valuable and will help to identify and prioritize rural transportation evacuation preparedness and needs.

Participation is completely voluntary. You do not have to take the survey if you'd prefer not to. You may skip any question that you'd rather not answer. All of your answers are completely confidential. You do not have to give us your or agency's name and any reports will contain only summaries of responses with no individual responses identifiable.

Survey results will be made available to interested participants. If you have any questions or complaints about the survey or to obtain the results, contact:

> Mr. Jaydeep Chaudhari
> Western Transportation Institute- Montana State University,
> 2327 University Way, Bozeman, MT-59717-4250
> Ph no: (406) 994 2322
> Email: jaydeep.chaudhari@coe.montana.edu

This survey is approved by the Institutional Review Board, Montana State University—Bozeman. The survey approval number is JC080409-EX. If you have any questions about the participant's rights as human subjects, contact:

> Dr. Mark Quinn, Chair
> Veterinary Molecular Biology, Montana State University
> 960 Technology Blvd., Room 127, Bozeman, MT 59717-3610
> Ph no: (406) 994-4707
> Email: mquinn@montana.edu

Thank you for agreeing to participate in this survey!

1. AGENCY CHARACTERISTICS AND SERVICES PROVIDED

1. Identification of Agency:

2. Please check the box that best describes your agency. (Check only one)

- Public Transit Agency/Authority: 9   (42.9%)
- Social Service Agency – Public: 1   (4.8%)
- School Bus System: 10   (47.6%)
- Senior Citizen Center: 2   (9.5%)

3. What is the geographic service area for the agency? If you have a map of the service area, please attach a copy to this survey or provide a web link.

• Countywide including urban, semi-urban, and rural areas (Specify County or Counties):	13 (54.2%)
• Citywide only (Specify):	0 (0.0%)
• Both city and countywide (Urban and Rural areas) (Specify):	5 (20.8%)
• School Bus/College/University Service jurisdiction:	2 (8.3%)
• Other (Specify):	4 (16.7%)

2. TRANSPORTATION SERVICES PROVIDED

4. Which mode(s) of transit service delivery best describes your methods of service delivery? (Check all that apply.)

Transit Service Delivery	Routine Transit Service	Emergency Event
1) Fixed route (fixed path, fixed schedule, with designated stops)	13 (100.0%)	3 (23.1%)
2) Demand response	12 (75.0%)	12 (75.0%)
3) Route and/or point deviation	5 (83.3%)	1 (16.7%)
4) Taxi	0 (0.0%)	1 (100.0%)
5) Other (Specify):_____	3 (100.0%)	2 (66.7%)

5. In what manner does your agency directly provide, purchase, operate, or arrange transportation for an emergency/evacuation event(s)? (Check all that apply.)

Mode of Transportation	Services for the General Public	Client/students Only Services
a) Personal vehicles of agency staff	0 (0.0%)	2 (100.0%)
b) Agency employees using agency-owned fleet vehicles	13 (86.7%)	6 (40.0%)
c) Pre-purchased tickets, tokens, passes for other modes of paratransit/transit	1 (100.0%)	0 (0.0%)
d) Reimbursement of mileage or auto expenses paid to clients, families, or friends	1 (100.0%)	0 (0.0%)
e) Volunteers	4 (100.0%)	1 (25.0%)
f) Information and referral about other community transportation resources	4 (100.0%)	1 (25.0%)
g) Operate own transportation program using agency owned vehicles and staff	10 (83.3%)	6 (50.0%)
h) Other (Describe in space provided below)		

Other:
- provide emergency/evacuation transportation to county residents with special needs as directed by ………County Emergency Management Office
- Trips are coordinated through local and state agencies
- emergency evacuation contracts with outside agencies

6. Define the level of passenger assistance provided for users of your transportation service in routine operation and an emergency/evacuation event(s). (Check all that apply.)

Level of passenger assistance	Routine Operation	Emergency Event(s)
1. Curb-to-curb (*i.e.*, drivers will assist passengers in and out of vehicle only).	12 (80.0%)	6 (46.7%)
2. Door-to-door (*i.e.*, drivers will assist passengers to the entrance of their origin or destination).	5 (41.7%)	10 (83.3%)
3. Drivers are permitted to assist passengers with a limited number of packages.	6 (46.2%)	11 (84.6%)
4. We provide personal care attendants or escorts to those passengers who require such services.	2 (33.3%)	5 (83.3%)
5. Passengers are permitted to travel with their own personal care attendants or escorts.	11 (78.6%)	9 (64.3%)
6. Passengers are permitted to travel with their pets.	2 (22.2%)	8 (88.9%)
Other:_ 1. Depends on the emergency if we are coordinating transportation for evacuation with the EMA or other emergency agency. We may make exceptions depending on the emergency for some situations 2. Special education buses have assistants on them		
7. None	4 (100.0%)	0 (0.0%)

7. What would be the maximum distance you would allow your agency's vehicle to travel for an evacuation?
- 0–24 miles: 0   (0%)
- 25–49 miles: 2   (8.7%)
- 50–74 miles: 4   (17.4%)
- 75–99 miles: 2   (8.7%)
- 100–149 miles: 6   (26.1%)
- 150–225 miles: 3   (13.0%)
- Other: 7   (30.4%)
    1. Whatever miles are deemed necessary by governing authority
    2. As required
    3. Depends on the emergency and where travel was needed and how far

4. Whatever the distance is to reach shelter
5. Unspecified/ what is deemed necessary for population/agencies evacuated
6. In county only
7. Part of parish OEP used in parish as needed

8. Please provide the following information regarding the vehicle fleet used in the transportation services provided directly by your agency. The vehicle type(s) used include the following:

Vehicle Type	Total Passenger Capacity (No. of Seats)	Number of Vehicles Owned	Number of Vehicles Leased	Total Number of Vehicles	Total Number of Wheelchair Accessible Spots
a) Cars	599	35		35	
b) Sport Utility Vehicles (SUVs)	47	6		6	1
c) Minivans	470	34		34	16
d) Standard 15-passenger vans	750	46	5	51	21
e) Converted 15-passenger vans (*e.g.*, raised roof, wheelchair lift)	395	48	11	59	90
f) Light-duty bus (body-on-chassis type capacity between 16-24 passengers)	1,117	56	5	61	52
g) Medium duty bus (body-on-chassis type capacity over 22 passengers)	1,191	28		28	35
h) School bus (yellow school bus capacity between 20 and 76 students	61,640	848	24	791	120
i) Medium or heavy duty transit bus	840	30		30	33
j) Other (Describe):					

Note: "Number Owned" and "Number Leased" should add to equal "Total Number."
Other:
1. 11 AMB PSNGR VANS & 10-14 AMB & WC PSNGR CUTAWAYS
2. One Type A 14 passenger special needs bus

3. COMMUNICATION

9. What type of communications device/system is used on a daily basis and in an emergency/evacuation event(s)? (Check all that apply.)

Communication Device/System	Daily basis	In emergency/ evacuation
• Cellular phones	19 (90.5%)	19 (90.5%)
• Two-way mobile radios requiring FCC license	13 (100.0%)	12 (92.3%)
• Pagers	0 (0.0%)	0 (0.0%)
• Satellite phone	1 (100.0%)	0 (0.0%)
• Telephone (Landline)	15 (100.0%)	14 (93.3%)
• Automatic Vehicle Location System	1 (100.0%)	1 (100.0%)
• Report submitted electronic	1 (100.0%)	0 (0.0%)
• Email (Black Berry)	6 (85.7%)	7 (100.0%)
• Facsimile	7 (100.0%)	7 (100.0%)
• Other (describe):_____		
• None	0 (0.0%)	0 (0.0%)

1. ……….. use southern linc on a daily basis and for emergency purposes

2. Two-way radio capability not requiring FCClicense

10. How do clients/customers/passengers access your transportation services in an emergency/evacuation event(s)? (Check all that apply.)

• Clients/customers must make an advance reservation (*e.g.*, by telephone, facsimile Internet, etc.).	7 (30.4%)
• There are no advance reservation requirements.	8 (34.8%)
• Transit access through an individual or social organization that help to arrange a ride.	9 (39.1%)
• Other (Define):	11 (47.8%)

1. Customers/passengers access our transportation services in an emergency evacuation event(s) through
2. School bus routes
3. Gulf County Emergency Management Office maintains a list of county residents with special needs and we provide emergency/evacuation transportation as per the direction of the EOC

4. If city, county or state wide emergency or evacuation in which our agency would be coordinating transportation with the EMA or other emergency personell, then there would be exceptions instead of making advanced reservations.
5. Through the County EOC
6. Contact thru emergency management
7. We work with the local Emergency Management agencies in Escambia County in case of disaster/hurricane evacuation events.
8. Evacuation contracts
9. Work in conjunction with local emergency operations
10. Emergency mgt office
11. Parish OEP uses our vehicles for evacuations as needed

11. If advance reservations are required for transportation in an emergency/evacuation event(s), how much notice must be provided? (Check all that apply.)

• We use a real-time reservation policy.	3 (23.1%)
• Customers/clients must call for a reservation 12 hours before final evacuation call.	3 (23.1%)
• Customers/clients must call for a reservation 24 hours before final evacuation call.	3 (23.1%)
• Customers/clients must call for a reservation two days before final evacuation call.	0 (0%)
• Customers/clients must call for a reservation three days before final evacuation call	0 (0%)
• Other (Define):	9 (69.2%)

1. All evacuations are directed by the EMA
2. Depending on the emergency or evacuation as to how much notice. If it is a city, county or state wide and our agency would working with the EMA or other emergency personell to coordinate transportation for evacuation then there will be exceptions made for that and less notice if any would be required
3. Evacuations are done only when declared mandatory. Evacuation with our fleet ceases when winds reach 35 mph.
4. We take reservation as far as three days ahead and sometimes until the last few hours
5. Director of emergency let's us know when to evacuated
6. Emergency management gives orders
7. Customers must registered in the local Emergency Management Office
8. Not applicable
9. As needed by E M C
10. Work with OEP

12. What communication source(s) are available for riders to make an advance reservation? (Check all that apply.)

Sources	Routine Transit Service	Emergency Event(s)
1. On-line Hurricane Registry	2 (66.7%)	2 (66.7%)
2. Calling Toll-free number	4 (80.0%)	4 (80.0%)
3. Calling 311 or 911	1 (25.0%)	4 (100 %)
4. Facsimile	3 (100%)	3 (66.7%)
5. Telephone	13 (86.7%)	11 (73.3%)
6. Email	4 (100.0%)	2 (50.0%)
7. Arrangement through third	6 (60.0%)	9 (90.0%)
8. Other		
9. None	2 (100.0%)	2 (100.0%)

Other:
1. People with special needs register with the County EOC
2. If our agency was working with the EMA or some other emergency or government personell, then they maybe able to contact 911 or another # to get them to coordinate the transportation with our agency
3. Emergency Management Office
4. Not applicable
5. OEP

13. Will you accommodate a same day or late reservation, or a rider with no prior notice, in an emergency/evacuation event(s) if space is available?

19 (100%) Yes   0 (0%)   No

Explain:

1. If we can accommodate them in an emergency or evacuation, then we would do what we could
2. Not applicable
3. Will if we can, if buses are available
4. Based on the request of Emergency Mgt
5. If it can arranged we will try to accommodate the service request. We do not do same day service

4. RIDERSHIP

14. Please provide your agency's most recent evacuation passenger statistics.

Unduplicated Persons/Passenger Trips	Estimated Ridership	Actual transit service requested	Actual service provided	Did not accommodate
• Total number of persons	110	16	26	
• Total number of passenger trips (most recent emergency event)	4	4	4	
• Total number of persons which the riders use a wheelchair	20	5	10	3
• Total number of pets along with their owner				

1. We have not used our vehicles for any emergency.
2. Each agency has a contract for a specific number of buses; numbers of persons are kept by that agency
3. In September we evacuated the entire student population of …… Middle/High Schools; total students participated numbered 1300
4. We were on standby but were not used.
5. The one van with wheelchairs was used for special need that was transported to north LA
6. We had one evacuation of our group home clients for …….. Inc. a few years ago due to a hurricane about 2004
7. Have not been called to evacuate
8. None

15. How do you estimate your ridership for an emergency/evacuation event(s)? (Check all that apply.)

- 2 (9.5%) Based on regularly maintained inventory

- 1 (4.8%) Inventory provided by faith-based organization

- 1 (4.8%) Based on daily ridership

- 9 (42.9%) Based on event-specific request

- 0 (0%) Based on census data

- 11 (52.4%) Inventory provided by emergency management agencies

- 3 (14.3%) Not applicable:_____

5. EMERGENCY EVENT SPECIFIC ISSUES

16. Does your agency have an Emergency Operation Plan?

      22 (100%) Yes   0 (0%) No

17. What emergency event(s) have you planned for if you have an emergency operation plan?

- 16 (72.7%) Explosion/terrorism
- 1 (4.5%) Levee break/Dam failure
- 4 (18.2%) Nuclear hazards
- 13 (59.1%) Fire
- 15 (68.2%) Severe storm
- 21 (95.5%) Hurricane
- 12 (54.5%) Flood
- 2 (9.1%) Earthquake
- 1 (4.5%) Volcanic eruption
- 15 (68.2%) Tornado
- 2   Other
  1. county's emergency management has a contract with the district
  2. Train derailments

18. Is your transit agency a part of the County's/State's Emergency Operation Center in case of emergency evacuation?

      20 (90.9%) Yes   2 (9.1%) No

19. Does your agency have a mutual aid agreement with other transit providers in your area for coordination during an emergency/evacuation event(s)?

      11 (52.4%) Yes   10 (47.6%) No

20. Does your agency have an established communication protocol with the following agencies? (Check all that apply.)

- 14 (66.7%) Law Enforcement Agency
- 8 (38.1%) Federal Emergency Management Agency
- 12 (57.1%) Department of Transportation
- 7 (33.3%) Medical Center/Health Facilities
- 20 (95.2%) County/State Emergency Management Center
- 7 (33.3%) Local Traffic Management Agency
- 4   Other: _____

    Other:
    1. Civil Defense, DHHH
    2. Mississippi Department of Education in Jackson, MS
    3. AL State Department of Education/Transportation Division
    4. OEP

21. Does your agency publicize the following emergency operation plan elements? (Check all that apply.)
    - 2 (18.2%) Route Map
    - 5 (45.5%) Shelter Facilities
    - 3 (27.3%) Pick up points/Bus Stops
    - 1 (9.1%) Reentry
    - 5   Other : _____
      Other:
      1. As deemed by ……..County Commission, EMA, Red Cross
      2. No
      3. shelter availability is publicized, as well as reentry
      4. No
      5. OEP does PSAs, distributes brochures, etc

22. Does your agency participate in any of the following reentry preparations? (Check all that apply.)

    - 3 (50.0%) Radio Inspection/Assessments prior to Reentry
    - 3 (50.0%) Traffic Management
    - 1 (16.7%) Debris Removal
    - 0 (0.0%) Restoration of Traffic Control
    - 1 (16.7%) Restoration of Road Infrastructure
    - Other:_____
      1. EMA, Sheriff Department and …….. works together
      2. No
      3. No

23. Have you ever participated in Mock Training Drills/Evacuation Preparedness Exercises?

           11 (50.0%) Yes   11 (50.0%) No

           If yes, what is the date of the most recent drill/exercise? 8 _____

    1. 6/4/2008
    2. August 2009
    3. April 2009
    4. 2009
    5. January 3, 2008
    6. September 2009
    7. 2009
    8. April 2009

6. EMPLOYEE ISSUES

24. Are your drivers trained to assist the following special needs population? (Check all that apply.)
- 15   (75%)   The elderly
- 20 (100%) People with disabilities and other medical conditions
- 6   (25%) Careless residents (residents who do not give attention or thought to avoiding harm)
- 8   (40%) People with limited English proficiency
- 15   (75%) People with hearing and visual impairments
- 10   (50%) People with service animals or pets
- Other 2:_____
    - Special needs services for our student population
    - Drivers are trained in PASS passenger assistance program CPR Bloodborne Pathogens, First Aid

25. Please provide statistics for employees who reported to work on the most recent evacuation call.

Employee	Total Employees	Reported to work
• Transit Director	21	20
• Transit Dispatcher	16	11
• Drivers (full time)	299	149
• Drivers(Part time)	150	37
• Mechanics	42	24
• Other:_____		

1. Never had an evacuation
2. Not applicable
3. Have not been called to participate

26. Do you provide compensation to your employees for working in an emergency/evacuation event(s)?

   18 (81.8%) Yes   4 (18.2%) No

27. Do you provide assistance to employees' families during evacuation?

   12 (57.1%) Yes   9 (42.9%) No

26. What arrangements have been made, if any, for evacuation of the families of transit operating employees whom you would expect to work during an emergency evacuation?

 1. Make sure they in a nearby shelter
 2. Movement to approved shelter
 3. We give employees notice and time to prepare for their families

4. They can stay at the Parish shelter
5. They can stay at the civil defense building or special shelter that is set up for employees
6. Take care of them first
7. Limited accommodations for members of staff at EOC
8. They are compensated by MEMA
9. Transport to shelters
10. We schedule employees with an ample break

28. Do you provide training to your employees on the following topics? (Check all that apply).

- 18 (94.7%) Assistance to special needs population
- 1 (5.3%) Reverse lane driving
- 12 (63.2%) Primary medical services (First Aid)
- 7 (36.8%) Incident Command System/Management
- 10 (52.6%) Emergency management
- 10 (52.6%) Emergency communication
- 7 (36.8%) Driving in hurricane traffic zone
- Other:_____

29. Please list any employee-related issues associated with past emergency/evacuation event(s)?
    1. Communications
    2. Unable to have family evacuate with them
    3. Low participation in the county
    4. Getting employees to return to work after the emergency

7. EVACAUATION PREPARATION

30. How much preparation time is required to implement your agency's emergency management plan to evacuate people?
    - 8 (47.1%) 1-4 hours
    - 2 (11.8%) 4-8 hours
    - 2 (11.8%) 8-12 hours
    - 3 (17.6%) 12-24 hours
    - 2 (11.8%) 24+ hours
    - Other
        1. 1-4 hours for short evacuation within a few blocks, 24+ for larger populated areas
        2. Depends on emergency, time, location, & other details
        3. we work with civil defense and whenever they make the call to evacuate we do so
        4. OEP Monitor Situations Advises to need
31. How are evacuation warnings and evacuation-related public information provided to the public and special facilities? (Check all that apply).
    - 18 (90%) Media-TV
    - 1 (5%) Loudspeaker
    - 20 (100%) Media-Radio
    - 3 (15%) Sirens

- 11 (55%) Media-Print
- 10 (50%) Knocking on Doors
- 12 (60%) Emergency Alert System
- 4 (20%) Text Messaging
- 1 (5%)   Government Owned Radio
- 2 Other: _____
   1. Not involved
   2. ………… Emergency Management

32. Do you have an inventory of passengers with special needs who would need transit service in an emergency/evacuation event(s)?

       13 (61.9%) Yes   8 (38.1%) No

33. Do you have a dedicated, accessible, and operational fueling site(s) where you can fuel your vehicle in case of emergency and electric power loss?

       16 (76.2%) Yes   5 (23.8%) No

34. Does your bus maintenance/operation facility have back-up generators in case of electric power losses?

       12 (60%) Yes   8 (40%) No

35. Do you have a security plan to protect your transit resources/facilities?

       18 (85.7%) Yes   3 (14.3%) No

36. Has your agency ever faced a passenger-related liability issue tied to emergency evacuation?

       1 (4.8%) Yes   20 (95.2%)   No

   If yes, please specify:

1. A passenger on the last emergency evacuation was not tied down properly in the wheelchair which caused her to fall out the wheelchair whenever the driver turned a curve and she did file suit against the agency.

8. EMERGENCY EVENT EXPENDITURES AND REVENUES

37. Does your agency charge a fare or fee for providing transportation services during an emergency/evacuation event(s)?

          4 (25%) Yes   12 (75%) No

38. What are your transportation <u>operating</u> revenues for the most recent emergency event? (0 answers)

Category	Amount
Transportation Operating Revenues – List Individually	
a) Fares Collected from Passengers Through Cash, or Tickets/Tokens Purchased by Passengers (Include Client Fees and/or General Public Fares Here)	
b) Revenues Collected From Cash or Ticket/Tokens Purchased by Third Parties on Behalf of Passengers	
c) Reimbursements for Services Obtained from Third Parties (*e.g*., Medicaid Reimbursements)	
d) City Government Appropriations	
e) County Government Appropriations	
f) State Government Appropriations *(e.g., DOAP)*	
g) Federal Grants: DOT-FTA	
h) Federal Grants: non-DOT	
1. Federal Emergency Management Agency Fund	
2. Temporary Assistance for Needy Families (TANF)	
3. Title IIIB-(Older Americans Act)	
4. Medicaid-Title XIX	
5. Social Services Block Grant-Title XX	
6. Administration on Developmental Disabilities	
7. Vocational Rehabilitation Programs	
8. Other (List)	
• Advertising	
• Contributions (specify)	
• Donations (specify)	
• Other, not listed above (Explain)	

39. Does your agency have contracts with third parties to provide transportation service or additional vehicles for emergency event(s)?

        4 (21.1%) Yes   15 (78.9%) No

   If yes, please complete the following table. (Include school or college/student transportation services as well, if applicable.)

Types of Service	Total number of vehicles	Total passenger capacity (Nos. of seats)	Rate and Basis of Payment (*e.g.*, Per Mile, Per Trip, Per Hour etc.)
1. Contract with Exceptional Children, Inc. (ECI)	5	85	Under contracts as per mile and hour
2. Contracts to provide buses to specific agencies	Up to 120	500 plus	Actual cost

40. Does your agency have a contract with a car rental company to provide emergency transportation service?

      0 (0%) Yes   20 (100%) No

If yes, please provide the following detail.

Name of Car Rental Company	Total number of vehicles	Total passenger capacity	Rate and Basis of Payment (*e.g.*, Per Mile, Per Trip, Per Hour etc.)

9. ASSESSMENT OF NEEDS/COORDINATION

41. What do you see as barriers/obstacles to emergency management activities in your service area? (Check all that apply).

Barriers/ Obstacles	Emergency Management Activities			
	Mitigation	Preparedness	Response	Recovery
Having to plan ahead	6 (75.0%)	5 (62.5%)	4 (50.0%)	4 (50.0%)
Lack of service	3 (50.0%)	5 (83.3%)	1 (16.7%)	1 (16.7%)
Lack of vehicles	1 (20.0%)	3 (60.0%)	3 (60.0%)	2 (40.0%)
Lack of operating budget	7 (70.0%)	8 (80.0%)	5 (50.0%)	4 (40.0%)
Hours of operation	1 (20.0%)	4 (80.0%)	1 (20.0%)	1 (20.0%)
Service	0 (0.0%)	1 (50.0%)	1 (50.0%)	0 (0.0%)
Do not prefer to mix populations (i.e. disabled with non-disabled)	0 (0.0%)	1 (50.0%)	0 (0.0%)	1 (50.0%)
Funding restrictions to provide service	4 (66.7%)	4 (66.7%)	4 (66.7%)	3 (50.0%)
Lack of communication facilities	2 (33.3%)	3 (50.0%)	3 (50.0%)	2 (33.3%)
Lack of accessible vehicles	1 (33.3%)	2 (66.7%)	2 (66.7%)	1 (33.3%)
Other (please specify below)				

Other:
1. Office of Emergency Preparedness handles all emergency situations. We provide vehicles for their emergency operations as needed.

42. What issues, if any, have your coordination efforts encountered in evacuation? (Check all that apply.)
   - 4 (57.1%)   Billing and payment
   - 0   (0%)   Mutual Aid Agreements between agencies
   - 1 (14.3%)   Insurance
   - 2 (28.6%)   Driver qualifications
   - 0   (0%)   Policies
   - 1 (14.3%)   Different vehicles

   Please give further detail on any items checked above.

Please provide any other comments you have about transportation planning and or operations during emergency/evacuation in your area.

Thank you for your cooperation!

Appendix E: Child Population Characteristics

Table 6. Study Area Counties and Parishes with Child Population Characteristics—2009

Counties	Children Population	Children in Poverty
LOUISIANA PARISHES		
Tangipahoa Parish	29.5%	33.1%
Washington Parish	28.5%	35.5%
St. John the Baptist Parish	31.6%	21.0%
St. Tammany Parish	28.3%	12.2%
MISSISSIPPI COUNTIES		
George County	32.5%	17.2%
Stone County	**	**
Pearl River County	27.3%	24.7%
Hancock County	26.5%	21.4%
Harrison County	29.5%	19.1%
Jackson County	28.9%	21.1%
ALABAMA COUNTIES		
Washington County	**	**
Clarke County	29.4%	32.3%
Monroe County	27.9%	28.7%
Escambia County	25.2%	38.2%
Mobile County*	29.1%	30.0%
Baldwin County*	25.8%	15.3%
FLORIDA COUNTIES		
Holmes County	**	**
Jackson County	23.1%	18.9%
Washington County	26.3%	37.5%
Calhoun County	**	**
Liberty County	**	**
Gadsden County	27.1%	38.6%

Source: Economic Development Intelligence System and ACS Demographic and Housing Estimates: 2006–2008
**Data unavailable

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