Enhancing Resource Coordination for Multi-Modal Evacuation Planning

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with Brian W. Conley and Christina M. Farrell

Technical Report MCEER-13-0002
February 8, 2013

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Executive Summary

This research project seeks to increase knowledge about coordinating effective multi-modal evacuation for disasters. It does so by identifying, evaluating, and assessing current transportation management approaches for multi-modal evacuation planning. The research increases equity by identifying strategies for evacuation of all residents, including carless residents during a disaster. The research also seeks to address the challenges of effectively incorporating multi-modalism into local emergency plans by enhancing transportation resource coordination through exploration of the feasibility of a new concept—a Transportation Reserve Corps (TRC). A TRC seeks to integrate planning for households without automobiles, multi-modal evacuation, and coordinated volunteerism with disaster preparedness, response and recovery.

Background

In an effort to understand the unique and complicated nature of disaster planning, we review published research about disaster preparedness, response, and recovery, especially as they relate to multi-modal evacuation. Although the federal government plays an integral role in disaster response, the primary authority during times of disaster still rests with state government. Most states place the decision to evacuate a locale with municipal leadership, specifically the chief executive officer of that municipality, if not the chief executive (i.e., Governor) of the state. This structure can generally be viewed as bottom-up, placing the authority to respond to a disaster or mandate an evacuation principally on the affected jurisdiction in ascending order: village, town, city, county, state.

Many types of emergency events may or may not necessarily warrant an emergency evacuation depending on numerous interwoven and unpredictable variables. Several factors determine whether or not an evacuation should, or will, occur in the event of an emergency. While some of these factors are based on types of emergency incidents—natural, technological, or malevolent acts—others are largely based on the preparedness of the community to handle a large-scale evacuation. These preparedness efforts include understanding the demographic composition of the community and the level of preparedness and training possessed by both community members and local government. In practice, the decision to undertake an evacuation, either by a municipality or by an individual, may not be entirely reliant upon a concrete set of factors. Whether or not to mandate an evacuation therefore arises as a “wicked problem” in that it most often cannot be determined by a replicable, systematic formula. Ultimately, during a crisis, people will pursue the action that they judge to be the best for their safety and well-being.
The Challenge of Multi-modal Evacuation

Planners, engineers, and government officials face the challenge of establishing integrated systems that not only promote equitable and sustainable urban futures but serve as efficient systems for mass evacuation when there is a mandated evacuation. The first, and arguably the most important reason, is that there are approximately 10.4 million “carless” households in the U.S. (or about 9.1 percent of all households). In addition to families without access to automobiles, carless people also include (1) those who live at home but are sick, disabled and/or elderly and (2) people who live in institutions such as hospitals, nursing homes, and prisons. While evacuating the carless is the most pressing reason for planners to consider in multi-modal transportation evacuation, reliance on single-occupancy vehicles in an evacuation can jeopardize an entire populations’ safety; when private automobiles are the primary source of transportation during an evacuation, traffic congestion in urban areas is likely to limit evacuation capability. Furthermore, multi-modalism is particularly important for emergency response and evacuation planning because it provides travel options that can accommodate diverse and uncertain needs that are linked to a disaster. High-capacity vehicles can be a resource for people with various mobility limitations, long-distance evacuations, and resource limitations such as road space, vehicles, and fuel.

Despite the importance of integrating multi-modal transportation into evacuation planning, many state and local governments do not have the appropriate plans, training, and exercises to evacuate households without automobiles. Strategies for effectively evacuating households without automobiles include pre-identifying the carless; providing vehicle inventories and instructions in advance to emergency responders; communicating with vulnerable populations about available assistance and transit and how to access it; and convincing evacuees to use that assistance to leave early. Transportation plans for disasters must include the quick and efficient deployment of high-occupancy vehicles. Such deployment requires an inventory of vehicles and their drivers, clear instructions for vehicle use, oversight of fuel, emergency repair and other support services, and proper coordination of these elements. Inventorying available transportation resources and matching carless individuals with appropriate and available modes of transportation, however, are challenges that planners face.

A number of legal and practical constraints make it difficult and expensive to incorporate multi-modal transportation into local emergency planning. Mutual aid agreements with neighboring jurisdictions and collaborative contracts and funding agreements with private providers can help ensure that transit vehicles, equipment, and trained drivers are available to meet surge requirements in an evacuation, but there are barriers to mutual aid agreements and legal obstacles that continue to discourage private-sector involvement. These issues include obtaining client medical information; the private-sector’s vulnerability to lawsuits; the private sector’s uncertainty about adequate reimbursement for services provided during a disaster; unified coordination between visiting units and hometown dispatchers; a lack of driver training; and
employees not reporting to work during an emergency for fear of their own and especially their family’s safety.

Another problem is that jurisdictional and inter-organizational complexity may render transportation management in the event of disaster exceptionally difficult. This was illustrated during Hurricane Katrina, where one of the biggest problems was how quickly civilian, local, state, and federal government organizations were overwhelmed. Improving inter-jurisdictional collaboration through disaster preparedness efforts—such as established protocols, training and communication—may be an effective way to increase the effectiveness of multi-modal transportation during large-scale urban evacuations.

Funding for evacuation-related operations and capital expenses for multi-modal transport is another frequently cited concern related to emergency planning. It is widely understood that there is a lack of sufficient transportation resources and the unlikelihood of an adequate number of vehicles being effectively deployed during a disaster. Recognizing the severity of consequences likely caused by this lack of adequate emergency transportation, various scholars have recommended the establishment of a new organization to fill this void.

**Volunteerism in Emergency Planning**
The limitations in local evacuation plans, a lack of coordination among various levels of government, and considerable disparities which obstruct communications between authorities and vulnerable populations during emergency situations can be addressed with a community-based volunteer organization. Some such volunteer groups already exist, generally falling under the national Citizen Corps umbrella, to address issues related to disasters and emergency response. The Citizen Corps is a forum where all individuals and organizations are invited to educate themselves on disaster preparedness and logistics in efforts to safeguard communities from harm. The Citizen Corps was established in the aftermath of the terrorist attacks of September 11, 2001 to embrace the irrepressible community spirit that invariably arises when a disaster strikes. In the period since, this organization has grown to a national network of 1,175 locally-based Citizen Corps Councils. By all accounts, its membership has proven to uphold the organization’s mission of coordinating community volunteers in order to build more resilient and secure communities. The Citizen Corps lists five partner programs—the most relevant to our research being the Medical Reserve Corps (MRC). Through this structured organization, willing medical and public health professionals are deployed more effectively during emergency response. The MRC exemplifies the administrative and procedural framework required for the effective management of any volunteer emergency response organization.
Transportation Reserve Corps

A Transportation Reserve Corps (TRC) is envisioned to be a volunteer-driven, community-supported organization for assisting primarily with the movement of people, but also supplies and goods during an extreme event or disaster—large or small. The main objective of a TRC is to assemble trained and licensed transportation coordinators and drivers (especially in situations where there are not sufficient drivers and vehicles to evacuate a population at risk) to conduct evacuations of buildings, neighborhoods, districts, cities or even entire metropolitan regions.

A TRC is not a transportation provider in the traditional sense. A TRC will not own, nor can it acquire high-capacity vehicles during an evacuation. Its primary role is coordinator of high-capacity vehicles, drivers, equipment and fuel that already exist in a community. A TRC will use a highly sophisticated system of training, credentialing, and mutual aid that co-mingles public transit agencies and private transportation providers, private citizens, and any related and supplemental organizations to accomplish its objectives.

The goals of a TRC in no way interfere with existing local evacuation plans. On the contrary, a TRC can provide outstanding support for communities that possess emergency plans and can serve as an important component of existing emergency infrastructure such as the emergency management communications plan and the Incident Command System (ICS). Likewise, TRC functions would not supersede or replace emergency procedures at facilities that already have thorough evacuation plans such as hospitals or nursing homes. Instead, it could aid in this type of an evacuation through resource coordination or could act as a “back-up” when drivers and vehicles have been exhausted. Furthermore, TRC volunteers are not designed to take the place of on-duty, professional emergency responders or vehicle drivers expected to act during an emergency, but rather a TRC’s volunteers’ roles are to supplement and/or relieve these first responders. This is an important function of a TRC because a large-scale disaster may demand the evacuation or movement of people and goods exceeding the capacity of existing emergency response networks. A TRC’s most valuable resources are its drivers; however, a TRC is not designed to train and certify drivers and assumes that drivers already possess the proper licensure. A TRC may, however, offer training for various emergency preparedness topics.

A TRC, positioned to focus much of its effort on preparedness while also functioning as a response and recovery organization, is an effective model for achieving its objectives. Preparedness efforts include (1) volunteer (both driver and non-drivers) recruitment, enrollment via online registration, volunteer licensure and credential checks, and volunteer emergency training, (2) resource management: inventorying volunteers, high-capacity vehicles, equipment and fuel, (3) procedures and protocols: establishing communication systems with public transit agencies, private transport providers, and volunteers; establishing mutual aid agreements; and achieving integration in a
meaningful way with existing emergency plans, emergency management organizations, and a community’s Incident Command System.

*Transportation Reserve Corps Key Facts*

<table>
<thead>
<tr>
<th>Profile</th>
<th>A volunteer-driven, community-supported organization for assisting primarily with the movement of people, but also supplies and goods during an extreme event or disaster.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>To better integrate planning for households without automobiles, multi-modal evacuation, and coordinated volunteerism with disaster preparedness, response and recovery.</td>
</tr>
<tr>
<td>Motivation</td>
<td>People who are unable to self-evacuate during a disaster—carless, young, old, people in institutions, people with disabilities—are the most vulnerable to injury or death; reliance on single-occupancy vehicles in an evacuation can have detrimental effects on an entire populations’ safety; multi-modalism provides travel options that can accommodate diverse and uncertain needs and unpredictable resource limitations common in emergency situations.</td>
</tr>
<tr>
<td>Emergency Planning</td>
<td>TRC does not create new emergency plans. It assists a jurisdiction in implementing its plan during the event of a disaster, with a focus on equity.</td>
</tr>
<tr>
<td>Resources</td>
<td>Volunteers (including vehicle drivers and non-drivers), high-capacity vehicles, maintenance equipment, fuel.</td>
</tr>
<tr>
<td>Coordination</td>
<td>With a community’s carless population, the jurisdiction’s Incident Command System, TRC volunteers, public transit agencies and private transport organizations, and other emergency management organizations.</td>
</tr>
<tr>
<td>Mutual Aid</td>
<td>Local, regional, state, interstate, federal, international.</td>
</tr>
<tr>
<td>Comparable Organisations</td>
<td>CERT and MRC share some characteristics.</td>
</tr>
</tbody>
</table>

*Transportation Reserve Corps Operations*

When a disaster is declared, an Incident Command System (ICS) provides coordinated and collaborative incident management in a community, especially where additional resources are required or are provided from various organizations within a single jurisdiction or outside a jurisdiction. It is imperative that a TRC be absorbed into an already established ICS because it is this call for additional resources that is the main function of a TRC; and because a TRC is reliant upon effective cross-jurisdictional and departmental coordination. When a request for resources from a TRC is made, a TRC, consistent with the procedures and protocols already established within the ICS, would communicate with appropriate transportation agencies and companies or volunteers to mobilize. The nature of an incident, more than anything else, decides the type and quantity of resources to be mobilized. A TRC would only respond with drivers, equipment or vehicles when requested by an appropriate authority, as previously established in preparation for activation.
TRC recovery actions would involve demobilization—the systematic and safe return of vehicles and volunteers to their places of origin or another secure location. A TRC would need to prepare for a demobilization process as soon as resources are mobilized in order to facilitate accountability, provide for the safety and well-being of volunteers, and provide efficient service. While the major role of a TRC is to better serve the carless population and those who cannot self-evacuate during an urban evacuation, a TRC could act in other important disaster recovery roles as long as liability insurance and mutual aid agreements are still in place. These recovery efforts could include traffic management, debris removal (employing volunteers trained to operate heavy machinery), pandemic relief (when citizens are confined to homes to slow spread of disease, but food and supplies must be distributed), and assistance in returning people to their homes after an evacuation.

Establishing a Transportation Reserve Corps
Other volunteer disaster response organizations, such as an MRC, operate through a nationally-based top-down structure, but there may be more interest in developing a TRC at the state level than at the federal level. This being said, as TRC response will require swift deployment of volunteer drivers, TRC units would be most effective if appropriate administrative models were developed at the local or county level. The first model might be to establish a new, independent home for a TRC. The second may be to house a TRC within an existing regional governmental agency such as city or county’s emergency service organization, regional transportation organization or metropolitan planning organization (MPO). The third might be to house and share administrative functions with a community’s existing formal volunteer organization associated with extreme events and disasters, and health and medicine. When deciding upon an appropriate administrative model for a TRC, a number of factors such as existing communication systems, technology, infrastructure, staffing and financial capacity would need to be taken into consideration. Dependent upon these factors, emergency managers should determine if a TRC could be absorbed into the operations of an existing organization or if a TRC would benefit from becoming an independent start-up organization that shares resources or partners with other emergency response and planning organizations.

Federal, state, and local funding sources will be needed to pilot and permanently establish a TRC. Funding for a TRC in the form of emergency preparedness grants could be sought from the U.S. Department of Homeland Security, U.S. Department of Transportation, U.S. Center for Disease Control, U.S. Department of Health and Human Services Health Resources and Services Administration. On a more local level, state offices of emergency management and transportation, local Metropolitan Planning Organizations (MPOs) for coordinated transportation planning, community foundations, local fundraising efforts, and mutually-beneficial partnerships (i.e., partnering with local nuclear power plants were also suggested). Funds could be collected privately to support local TRC efforts, through an organization like the American Automobile Association, which could collect $1 (voluntarily) from new
members and renewal members to support local evacuation planning for manmade and natural disasters.

The geographic setting of a TRC is the dominant factor in determining the types of disaster to which its membership must be prepared to respond. The size of an area, in terms of both geographical coverage as well as population, has a tremendous impact on the practicality and functionality of a TRC. Other spatial dynamics, such as the likely types of natural disasters for any geographic region, should also play a large role in determining the feasibility and operating considerations of any application of a TRC model. Research gathered through the interview process suggests that a TRC is best suited to mid-sized metropolitan areas, where some or all of the supporting structure (organizations, leadership, written plans, vehicles, expertise) for a TRC is in place. These elements may not be in place in small cities and rural areas.

**Research Findings**

A majority of emergency management professionals consulted in the development of this report identified potential challenges in establishing a TRC. These discussions, supplemented by a review of relevant laws and literature, generally fall under four categories; (1) providing liability coverage and insurance for a TRC, its volunteers, and its vehicles, (2) ensuring that TRC volunteers possess the training and credentials necessary to respond to emergency events, (3) securing resources through legal agreements, inter-organizational reciprocity and reimbursement and (4) ensuring that a TRC is sustainable and functional. This report addresses these challenges and expands upon the scope of existing evacuation organizations that utilize volunteers, such as Evacueer in New Orleans.

Having refined and detailed a TRC’s approach to transportation resource coordination for multi-modal evacuation, and identified its challenges, there are several actions steps we recommend for further research and to begin implementation of a TRC. These steps include (1) advocating for the inclusion of multi-modalism in emergency planning, (2) developing a plan for broad volunteer recruitment, and (3) further research about four key topics: (a) defining an organizational structure and business plan, (b) identifying permanent funding sources, (c) identifying best practices in the use of mutual aid agreements, taking into consideration identified challenges such as liability, reciprocity and reimbursement, and legality—especially in instances where adjacent states have conflicting laws—that could require modifications to state and federal legislation, and (d) vehicle modification and technological additions that could assist multi-modal evacuation of the carless population during large-scale disasters. In addition, a smartphone app could be developed to link evacuees with volunteer TRC members during a disaster.

The final action step is to launch a pilot test of a TRC. Using the outcomes of our research, we present recommendations on a suggested process to establish a pilot
program including location choice, community outreach, conducting an initial tabletop exercise, a work plan for preparedness activities, completing a pilot emergency response exercise, and assessing the results.

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