A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events

FINAL RESEARCH REPORT

Prepared for the National Cooperative Highway Research Program

Transportation Research Board

of the

National Academies

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Disclaimer

Abstract

This report documents the study process and key findings that resulted in the *Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events.* The project research included a literature review, survey, interviews and webinars. The Guide's purpose is to help transportation and non-transportation stakeholders, such as emergency managers and first responders, better understand transportation's important role in building resilient communities. The research discovered multijurisdictional transportation planning for disasters, emergencies, and significant events taking place in many locations across the country, in many different institutional frameworks. Such planning shares precepts of communication and collaboration, supported by eight basic principles that enable communities to better recover after a major disruption. Effective planning is comprehensive, cooperative, informative, coordinated, inclusive, exercised, flexible and continuous. By using principles that are shared by multiple sectors, the Guide provides linkages between transportation planning processes, which primarily center on mobility as expressed in infrastructure, equipment and operations, and emergency management planning processes, which aim at mitigation, preparation, response, and recovery. The Guide has an Introduction and four sections: Principles (including characteristics, strategies, and examples); Case Studies from diverse geographic regions and settings; Tools including checklists and discussion guides; and Additional Resources: glossary and annotated list of resources.

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Summary

Transportation is one of multiple critical infrastructure components of a community. Most days most people in most communities can take their transportation assets and systems somewhat for granted, because transportation in general functions effectively and reflects good, regularly updated planning. On a day when something out of the ordinary radically affects entire communities and beyond, transportation comes into sharp focus because it is so essential.

Planning for these events is as necessary to transportation agencies as planning for rush hours and snow removal, but it is more challenging because it requires a much greater emphasis on communication and collaboration with a variety of stakeholders, particularly those in the response community. Planning for disasters, emergencies, and significant events is a whole community planning effort; emergency management organizations often head up this work, but transportation managers and planners must take leadership roles if communities are to be ready and resilient.

This report covers the development of the *Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events* (Guide). The Guide's purpose is to help transportation stakeholders as well as non-transportation stakeholders, such as emergency managers and first responders, understand better transportation's important role in building resilient communities. Some local public agencies, such as emergency management, first responders, and regional planning organizations, often have not considered or included transportation professionals in their emergency planning efforts. The Guide provides linkages between transportation planning processes, which primarily center on infrastructure, equipment and operations related to mobility and access, and emergency management planning processes, which aim at mitigation, preparation, response, and recovery by using principles that are shared by both sectors.

Geographical regions that have had frequent or recent incidents have begun to bridge this historical disconnect between transportation professionals and their counterparts in emergency management. Resilient communities able to respond and rebuild quickly must be part of a broader regional, multijurisdictional resilience effort, built on collaborative advance planning, well- thought-out, and clearly communicated.

Four key components comprise the research that led to the Guide: a literature review, a national survey, follow-up telephone interviews with key stakeholders who had first-hand experience and knowledge of planning for emergencies, disasters, and significant events, and two webinars to review the draft guide, one with the study panel and one with key stakeholders. The research discovered multijurisdictional transportation planning for disasters, emergencies, and significant events taking place in many locations across the country, in many different institutional frameworks and settings. The guide examples and case studies focus on the positive applications of the principles of multijurisdictional transportation planning for disasters, emergencies and significant events, including "lessons learned", rather than emphasizing failures in planning.

The Guide presents eight principles for multijurisdictional transportation planning that support the common goal of resilience. Multijurisdictional transportation planning must interface with emergency management and other key stakeholders (public, private, and nonprofit) to prepare for disasters, emergencies, and significant events. The elements or precepts that bind all the principles together no matter where planning takes place are communication and collaboration shown here as encircling elements that create a planning circle. (Figure ES.1) The associated principles of Informative and Cooperative are shown as elements of the circle, because as components of any specific plan, they will yield tactics for use in building readiness and resilience in the particular communities doing the planning.

The eight principles are:

- Comprehensive
- Cooperative
- Informative
- Coordinated
- Inclusive
- Exercised
- Flexible
- Continuous/Iterative
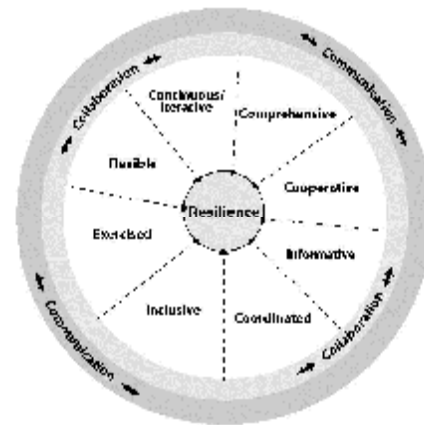
Figure ES-I: Circle of Principles

These principles provide a common vocabulary across the many disciplines, levels of government, and private, nonprofit, and public sector agencies that contribute to a good community plan. The shared vocabulary permits a collaborative effort that promises sound preparation, effective response, and rapid recovery.

The guide provides examples of effective planning in a variety of planning frameworks and institutional settings. The processes and outcomes, based on the application of the guide's eight principles, suggest a robust, but flexible planning framework that any region will be able to adapt and apply to its particular circumstances. Resilience is an achievable goal when multijurisdictional, multidisciplinary relationships, communication, and planning are in place prior to an emergency. The principles in this guide foster such relationship building and planning.

The principles become the main parts of Section 1 of the Guide. Each principle "subchapter" includes an overarching statement that summarizes the principle, its characteristics, strategies to implement it, examples and excerpts from case studies that illustrate its use, and cross references to supporting tools.

In Section 2, the Case Studies present longer illustrations on how agencies and organizations have developed multijurisdictional planning for disasters, emergencies, and significant events, effectively applying most or all of the principles. This section includes descriptions of entities that have developed and evolved to work out the frameworks and the details of multijurisdictional, multi-agency, private and public sector coordination (including transportation) for mitigation of, response to, and recovery from disasters and emergencies. These entities have at times employed their established relationships to create breakthroughs in dealing with planned events of national significance, as well as emergencies. The case studies were selected to serve as guides and have the ability to be scaled up or down based on the specific needs of the community.

Section 3 provides tools, such as checklists, tables and discussion guides. Section 4 provides additional resources such as glossary and an annotated list of resources that support the principles and strategies.

CHAPTER 1
Background

Disasters in the United States and internationally have highlighted the consequences of disasters not only on the immediately impacted area, but also on other jurisdictions and regions. Responding to disasters, emergencies, and significant events requires broad, multijurisdictional planning that is collaborative and well communicated. Plans must be designed to facilitate responses by public and private transportation stakeholders and planners.

A significant body of planning knowledge has developed in the last decade around disasters, emergencies, and other significant events. It has grown from theory and necessity, practice and experience. In America and around the world, natural and manmade circumstances have challenged individuals, organizations, and communities to get ready, respond effectively, and recover quickly. Although lessons learned from each event mean better outcomes, disaster planning is a terrible place to fail. People and organizations charged with disaster and emergency planning want to put the best possible planning in place, and they are increasingly willing to share resources – information, people, and even funding – to achieve it. Regional coordination is also required for large, planned significant events, such as Super Bowls, all-star games, or presidential inaugurations. Although there are differences in the planning for disasters and special events, there are also many commonalities, and some regions have learned to hone their skills, strategies, and coordination for emergency events by practicing on large planned events.

Although the truism "all emergencies are local" generally holds true – with occurrences and impact usually specific to a locale – increasingly planning is regional. Sufficiency in preparation, response, and recovery is simply beyond the reach of any agency or jurisdiction to achieve alone. Yet knowledge about disaster and emergency planning is all too often "local," experience and/or information put together by one entity and shared or discovered in a limited way by others. Local planning for emergencies of all types must extend beyond a community's "customary and comfortable" borders to bigger regions, because disasters do not recognize political boundaries. Frequently, planning must extend to multi-state operations, or even cross international borders, to prepare for events that either impact a larger area or overwhelm local resources and require more than local help.

Transportation stakeholders must communicate and coordinate responsibilities, roles, limitations, and capabilities among all public and private entities involved in operations and planning for regional disasters, emergencies, and significant events. To meet this need, the transportation and emergency management planning sectors (and related fields) need a guide that synthesizes and makes usable the best of current (as well as classic) disaster and planned special event planning knowledge. Research into that knowledge can result in developing a logical thought process as to what should be considered, with whom to collaborate inside and outside the transportation community, and how to lead discussions with or ask questions of those unfamiliar with emergency transportation planning and operations.

CHAPTER 2
Research Approach

Research Objective

The objective of the research was to develop *A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events* with principles and resources for facilitating regional transportation planning, coordination, and operations across all modes for disasters, emergencies, and significant events. The Guide is to be use by transportation planning and emergency management stakeholders with sufficient detail to allow users to adapt it to their individual entities.

In the initial work plan, the objective of the research was to identify specific processes and guidance that would lead to the development of the Guide and a "go-kit" that would lay out how best to implement regional transportation planning for disasters, emergencies, and significant events. After the interim report was reviewed, however, the Project Panel directed the project team away from developing stepped processes and using standard operating procedures language, and instead toward focusing on planning transportation principles and promising applications of these principles in examples and case studies.

As a result of this new direction, the Guide was specifically designed to help public and private agencies – particularly within the transportation and emergency management sectors -- work together to plan a dynamic, regional strategy. This strategy must encompass multiple jurisdictions, agencies, populations, and sectors to secure human life, move people from harm's way, maintain communications and connections, meet basic human needs, restore critical infrastructure and services, and help with recovery efforts. It must also recognize and encompass the differences and the commonalities in planning processes- including long range transportation planning, contrasting and complementing transportation operations planning and long range emergency mitigation planning; and short range emergency operations planning, also complementing and contrasting transportation operations and long range emergency mitigation planning.

Research Approach

Four key components comprise this research report: the literature review, a summary of the national survey, a summary of findings from follow-up telephone interviews, and a summary of the webinars that provided guidance on finalizing the guide. Interviews were held with key stakeholders who had first-hand experience and knowledge of multijurisdictional planning for emergencies, disasters, and significant events; some findings from interviews were used as examples, while others were developed into case studies. The case studies that developed from some of the interviews are not replicated here, as they are included in the guide itself.

Literature Review

The project team examined and analyzed pertinent domestic and international research, on the basis of applicability, conclusiveness of findings, and usefulness for regional transportation planning for disasters, emergencies, and significant events for all modes of transportation (public and private). The review included research that was completed and underway; accepted practices; guidelines; published plans; tools; systems; training; exercises; and after-action reports from regional transportation disaster responses to real national and international events. The researchers divided this broad topic into discrete focus areas:

- Highways

- Transportation disadvantaged and vulnerable populations and the role of public transportation

- Emergency management

- Metropolitan planning organizations (MPO) and other regional planning organizations

- Utilities

- Border and perimeter considerations

- Freight

- Collaboration

The focus of the review was to highlight areas that have been recognized or, if they have yet to be implemented, anticipated to be effective. The review did not attempt to discuss every tool or practice, but rather to give the reader an overview of the major focus areas in which these practices, tools, and technologies were categorized so that they may be applied and adapted in any location and for any emergency.

The literature review and a matrix of literature reviewed by the project team are in Appendix A.

National Survey

The second component of research was a national web-based survey to gauge transportation's role in regional planning, coordination, and operations across all modes for disasters, emergencies, and significant events. Practitioners from federal, state, local, Tribal, and regional entities participated in the survey. The survey's objective was to obtain existing practices, policies, lessons learned, and barriers to transportation's role in multijurisdictional transportation planning, coordination and operations. The survey also helped identify potential candidates for follow-up interviews.

The survey findings indicated that varying levels of regional transportation planning were taking place in many U.S. communities, and in general with more planning and coordination occurring in communities that have experienced one or more recent emergencies, disasters, and significant events. Analysis of the survey results pointed to key findings and common themes as well as to gaps that can be further explored in subsequent research and in the project's Guide. The survey summary is in Appendix B.

Survey Methodology

The project team used Survey Monkey to develop and distribute the online questionnaire and analyze the results. Survey questions addressed topics, such as respondents' role in planning for emergencies and significant events; experience with various types of hazards and events that required multijurisdictional responses; level of experience with multijurisdictional and interagency collaboration and planning; types of regional plans that address emergency transportation management; types of transportation modes and assets included in emergency plans; and multijurisdictional policies and practices pertaining to emergency transportation planning. Survey questions included a variety of response techniques, including multiple choice answers, matrices, text entry, and Likert scales.

Initial drafts of the survey went through two rounds of pilot testing. Pilot test participants in the first round included people with whom project team members were connected and who had professional experience and expertise relevant to the survey. The second round of pilot testing included those same participants in addition to the project panel.

The pilot test generated 123 responses. The pilot test served two important purposes: it helped to improve the survey tool and to identify potential candidates for subsequent interviews conducted for this study. After the pilot test was distributed and responses were collected, members of the project team held phone calls with pilot test participants to obtain more detailed feedback about how to improve the survey. Subsequent revisions to the survey were made based on the feedback received from the pilot test. The final draft of the survey was reviewed and approved by the project panel prior to distribution. Three pilot test participants also participated in follow-up interviews.

The survey was distributed through listservs, team members' contact lists, and other distribution channels with the goal of reaching respondents from all 50 states. Survey responses totaled 160 and represented a wide geographic distribution; all 50 states; the U.S. Territories in the Pacific and Caribbean, and the Pacific Compact Nations were also represented. Midwest states, such as Missouri, Iowa, and Kansas generated 31 percent of responses. Eastern states, including Massachusetts, New Hampshire, and the District of Columbia combined represented 20 percent of responses. Eleven percent of respondents worked in western states, such as California, Oregon, Washington, Idaho, and Arizona.

Each project team member was responsible for distributing surveys to practitioners that represented eight specific topic/focus areas, including:

- Focus Area 1: Highways, private sector organizations and large employer considerations
- Focus Area 2: Transit and related "high capacity" modes, including nonprofit agencies and other types of organizations
- Focus Area 3: Metropolitan planning organizations, rural planning organizations, and special rural considerations as well as people with access and functional needs
- Focus Area 4: Emergency management and non-transportation functions, such as law enforcement, including coordination with hospitals and nursing homes and other types of organizations (for example, military)
- Focus Area 5: Border and perimeter issues pertaining to international borders, borders with Tribal nations, and other related examples
- Focus Area 6: Utility and related infrastructure issues, including power, water, and sewer
- Focus Area 7: Freight issues for emergency and special event transportation planning
- Focus Area 8: Collaboration

In addition, the literature review findings were used to identify survey candidates. In some cases, team members conducted extensive research to identify potential survey participants in their assigned topic/focus area. For example, some team members selected survey contacts because they were identified by professional organizations, such as the Association of Metropolitan Planning Organizations, as having good transportation planning practices.

A deliberate and targeted effort was made to generate participation from emergency management (EM) organizations, state emergency management agencies, and other emergency management personnel because the demographic results at the midway point of the survey period were showing gaps in EM representation. More than 800 email invitations were sent to professionals in the EM industry in more than 14 states and one Tribal emergency management organization.

While only five survey respondents identified their agency as an emergency management agency, 30 percent (48) of respondents identified themselves as an emergency manager (federal, state, or local),

emergency management first responder, or other emergency management. An additional 18 percent (28) of respondents identified themselves as emergency planners.

EM organizations were a specific focus of outreach efforts because they typically have a greater diversity of EM professionals. Targeted research efforts to identify EM professionals found that some EM organizations had member contact information publically posted, while other contact information had to be data-mined. Contact information for EM professionals was also identified through state EM websites. In states that did not have EM organizations, a direct email was sent to state EM agency points of contact. A specific effort was made to identify regional representatives or EM committee members who could forward the survey request to colleagues and constituents.

Demographic Characteristics of Respondents

Overall, respondents represented communities of varying sizes, with the larger urban areas more commonly represented. Nearly half of respondents worked in agencies or organizations that served more than 1 million people. In addition, 14 percent of respondents' agencies/organizations served communities of 100,000 to 500,000 and 13 percent represented communities of 500,000 to 1 million. Only 6 percent of respondents represented rural areas of less than 10,000 people.

Survey respondents represented different types of agencies, with 45 percent of respondents representing local, county, and state governments. MPOs accounted for nearly 20 percent of respondents. University/educational institutions and nonprofit organizations also combined for 20 percent of respondents. Approximately 13 percent of respondents identified themselves as representatives of a transportation agency or provider.

Interviews

The project team conducted approximately 30 telephone or face-to-face interviews with key stakeholders with experience in various geographies; with different types of disasters, emergencies, and events; and in multijurisdictional planning. The goal of the interviews was to identify best or promising practices and missed opportunities in multijurisdictional transportation planning around disasters, emergencies, and significant events. Interviewers asked specifically about best or promising practices that were considered:

- Successful over time
- Scalable
- Replicable
- Measurable or had quantitative outcomes
- Instrumental in improving multijurisdictional performance
- Innovative

The interviewers asked about difficulties encountered in multijurisdictional planning, coordination, and operations; how these difficulties were overcome, if they were; and challenges that still remained. This included how long-range and short-range transportation planning meshed with emergency planning cycles – what worked well and what didn't, and how transportation planning efforts, such as demand models, were used in emergency planning scenarios and planning and response efforts. The interview guide is in Appendix B.

Webinar

When a draft of the Guide was completed, the project team convened two one-hour webinars, first with the Panel, and second with stakeholders and one Panel member to assess the utility of the Guide, both in content and formatting. Ten stakeholders were in attendance at the second webinar, representing MPOs, Departments of transportation (DOTs), emergency management, Tribal emergency coordinators, and other experts. In addition, others who were not able to attend were sent a follow-up email to provide comments. One person who was unable to attend was interviewed individually. The attendees at the second webinar were able to view and comment on two alternatives to the main graphic and alternative layouts.

The Panel members and stakeholders were very engaged in the conversation, and provided extensive comments and recommendations for the Introduction, minor comments on Principles, Case Studies, and Tools, and helpful feedback on the base and alternative graphics and layout options.

Major comments from the stakeholder webinar include:

- Provide more discussion and description on resilience, including metrics.
- Provide linkages between transportation planning processes and emergency management planning processes- demonstrate where they can support each other (graphically and in text). One attendee believed such linkage had not been provided before and would be extremely useful.
- Keep at high-level- avoid "weeds" of SOPs- planning processes different.
- Clarify- this is NOT a stepwise process, but supports those processes.
- Center is strong, intro and tools need more work.

As a result of the webinars, the project team revised the draft to incorporate many of the comments.

C H A P T E R 3
Research Findings

Literature Review

The literature review looked at a vast spectrum of policies, plans, techniques, operations, and systems that have been applied or are planned for use in confronting the challenges that professionals face in multijurisdictional transportation planning. Researchers divided this broad topic into discrete focus areas:

- Focus Area 1: Highways, private sector organizations and large employer considerations

- Focus Area 2: Transit and related "high capacity" modes, including nonprofit agencies and other types of organizations

- Focus Area 3: Metropolitan planning organizations, rural planning organizations, and special rural considerations as well as people with access and functional needs

- Focus Area 4: Emergency management and non-transportation functions, such as law enforcement, including coordination with hospitals and nursing homes and other types of organizations (for example, military)

- Focus Area 5: Border and perimeter issues pertaining to international borders, borders with Tribal nations, and other related examples

- Focus Area 6: Utility and related infrastructure issues, including power, water, and sewer

- Focus Area 7: Freight issues for emergency and special event transportation planning

- Focus Area 8: Collaboration

The Literature Review for each of the focus areas is in Appendix A. However, the primary findings from the review are distilled in the Principles and their characteristics identified in the Guide.

Report of Key Survey Findings

Survey findings demonstrated the level of regional transportation planning taking place, including the extent to which interagency collaboration is occurring; the prevalence of planning for transportation disadvantaged populations and people with access and functional needs; and the level of prioritization and funding for including emergency management in regional plans.

Survey Findings

Analysis of the survey results pointed to key findings and common themes as well as to gaps that can be further explored in subsequent research.

Regional Planning Practices

- Survey respondents were most familiar with or involved in developing regional long-range transportation plans; these plans had the least prioritization and funding for including emergency management in the plans.

- The survey results demonstrated a range of regional transportation planning practices among survey respondents.

- Transportation planning for emergencies was most commonly addressed in regional or state plans and annexes.

- Re-entry and recovery plans were less common regional practices.

- The survey results indicated a lack of planning for using available transportation modes in emergencies and other events. While multiple transportation modes were available in survey respondents' regions, the percentages of those modes included in emergency plans decreased significantly.

- Regions with some type of a planning organization of were predominately represented; however, planning organizations' participation in transportation around emergencies and planned events was not a widespread practice.

- Barriers to effective regional transportation planning for emergencies, disasters, and planned special events or events of national significance were issues related to funding, limited time and staff resources, communication between agencies and across various organizational levels, and traditional stovepipes in and between organizations.

Planning for Transportation disadvantaged Populations and People with Access and Functional Needs

- The survey findings did not indicate a prevalence of practices related to planning for transportation disadvantaged populations and people with access and functional needs, particularly in regard to planning for recovery and re-entry.

- Planning for sheltering people with access and functional needs and service animals as well as pet sheltering were less common practices than planning for shelters for the general population.

- Despite being in regions that had transportation options for transportation disadvantaged populations and people with access and functional needs, survey respondents did not have a strong level of agreement that these segments of the population evacuated safely in the last large-scale emergency.

Regional and Interagency Collaboration

- Interagency coordination was a common regional practice.

- Survey findings showed consistencies in the ways respondents' depicted their regions' levels of interagency and multijurisdictional coordination and the regional planning and collaboration processes taking place.

- Collaboration on transportation planning for disasters and emergencies was more common than for planned events.

- Coordinated communication planning with nongovernmental organizations was not a widespread practice.

- Despite maintaining collaborative efforts with other agencies and organizations for regional transportation planning, those efforts did not necessarily lead to establishing formal agreements and contracts for securing transportation resources.

- Overall, formal agreements and other contracts were not a common regional practice. Respondents' regions were more likely to have agreements or contracts with peer agencies in other regional jurisdictions than with nongovernmental agencies, including those in the private sector.

- The survey findings were used to identify gaps in regional transportation practices that can be further explored through subsequent interviews. The survey findings were foundational to the development of the *Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events.*

The survey generated only three responses from transit agencies, two of which operated or managed bus or van demand response/variable route modes and one that provided bus fixed route mode.

Approximately 34 percent (54) of respondents defined their multi-jurisdictional area as one region (for example, an established metropolitan, rural, or tribal planning organization region); 28 percent of respondents defined their region as one state. In addition, 21 percent (33) of survey respondents defined their regions as multiple adjoining jurisdictions.

Survey respondents represented multiple disciplines and carried out a variety of functions in their agencies. More than half of the respondents had an emergency management title or role in their agencies, including emergency planners and emergency management first responders. Transportation planners accounted for more than 25 percent of respondents. Figure 3 includes a breakdown of survey respondents by discipline/function.

Survey Limitations

The sample size of this survey precludes drawing definitive conclusions about the state of the practice in regard to multijurisdictional transportation planning; however, the sample size was significant enough to provide a representation of current practices related to multijurisdictional transportation planning for disasters, emergencies, and planned special events or events of national significance.

Out of 160 respondents, 68 percent finished the survey. Some questions generated a smaller sample size than others because survey respondents chose not to answer every question. The number of respondents that answered each question varied by question. While every effort has been made to report the results accurately, percentages were generated based on the number of respondents that answered each question.

Interviews

From the detailed interviews, the team prepared report of findings that included best, good or model practices; lessons learned; challenges encountered in regional or multijurisdictional planning; and a glossary of terms.

Themes emerged from the interview around:

- Interviewees repeatedly underscored the critical need for pre-event communication and collaboration among public agencies engaged in regional transportation planning around emergencies.

- Interviewees stressed the importance of MPOs or regional councils (RCG) in addressing the "big picture" issues in planning for planned special events or events of national significance and disaster response and recovery.

- Among the most notable areas that worked well were regularly scheduled joint meetings with other agencies involved in the planning and response of emergencies. These frequent meetings help build relationships with people who are in a position to have the authority to get things accomplished. Joint exercises were also mentioned as being helpful especially for new agencies and personnel who may be unfamiliar with emergency terminology and operational procedures.

- The rise of social media has made e-communication essential in disseminating information about disasters, emergencies and planned special events or events of national significance among emergency management, first responders, and significantly with the general public.

- Reentry is a big challenge for almost all agencies involved in recovery from a disaster or emergency.

- Many interviews identified funding as a key constraint in multijurisdictional planning. Others identified restrictions in funding for security. Many who were familiar with traditional highway and transit grant funding were not be aware of security and emergency planning funding.

C H A P T E R 4
Guide Development

The *Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events* is the culmination of the project research activities, drawing heavily the synthesis of current practices and planning principles. The deliverable is an evidence-based, actionable guide that distills the considerable efforts that have gone into all-hazards regional transportation planning and the resulting body of research and information gathered throughout the project. Principles and guidelines for regional transportation planning, coordination, and operations across all modes for disasters, emergencies, and significant events, formed the basis of the guide. The guide also emphasizes that such planning can take place in varied contexts and institutional frameworks, from public to non-profit sectors. The planning is not restricted to traditional transportation planning frameworks, such as long range transportation planning, but is also highly relevant to transportation and emergency management operations planning, and to hazard mitigation planning.

Objectives of the Guide

The key outcome from embracing and applying the eight planning principles is a more resilient community. The guide explains how the principles shape action-oriented planning with tools to accomplish it and examples of communities that have gone through the process.

The major objectives of the guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events are to:

- Raise the level of visibility and relevance in transportation planning for emergencies, disasters, and significant events;
- Increase awareness of public and private assets and capabilities that may be available to support response efforts locally, countywide, statewide, regionally, nationally, and internationally;
- Improve resilience to withstand changing environments and more quickly restore normal operations;
- Facilitate informed dialogs and planning between transportation and other major stakeholders for emergency planning;
- Help establish grassroots collaborative networks to help plan ways to mitigate, respond to, and recover from emergencies, disasters, or a significant event; and
- Identify common causes that can benefit from shared resources.

Assumptions that framed the Guide's content were:

- Agencies and organizations that participate in planning will vary by location; planning will reflect the particular geographic, environmental, demographic, and transportation system characteristics within each region.

- Regions will be at various points in the planning process. Some may not have considered the multijurisdictional aspects of transportation planning for disasters, emergencies, and significant events and will find helpful guidance. Others with integrated, tested regional emergency transportation plans may be able to use this Guide to evaluate their plans and operations and look for opportunities to improve.

Guide Organization

The guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events is organized around key planning principles identified through the research.

The principles become the main chapters of **Section 1** of the guide. Each principle section includes an overarching statement that summarizes the principle, characteristics of the principle, strategies and tips to implement it, examples of successful application of the principle, and cross-references to tools and case studies that further illustrate and support the principle.

Section 2: The Case Studies section presents some longer case studies that illustrate in greater depth how agencies and organizations have developed multijurisdictional planning for disasters, emergencies, and significant events, effectively applying most or all of the principles. This section also includes descriptions of entities that have developed and evolved to work out the frameworks and the details of multijurisdictional, multi-agency, private, and public sector coordination (including transportation) for mitigation of, response to, and recovery from disasters and emergencies. At times, these entities have employed their established relationships to create breakthroughs in dealing with planned events of national significance as well as emergencies.

The case studies have been selected to serve as guides and have the ability to be scaled up or down based on the specific needs of the community. Users are encouraged to first review the principles, refer to the tools as needed, delve into the case studies for more real-life examples, then refer to the resources in the Section 4 for further information.

Section 3: The Tools section of the guide provides eight tools that support the principles. The tools include checklists, tables and discussion guides.

Section 4: The Additional Resources section of the guide provides a glossary, an annotated list of resources that support the principles and action steps, and a list of references. Some resources are presented throughout the document, to better document the principles they support; that information is repeated in the Additional Resources section for ease of reference.

APPENDIX A
Literature Review

Focus Area 1 – Highways

The effectiveness of highway transportation systems for the safer and more effective movement of traffic during emergencies in events can be significantly improved with adequate advanced planning and training. Capacity and demand management techniques, such as signal coordination retiming, route closures, conflict point elimination, contraflow, evacuation phasing, and forced movements, have been shown to reduce congestion while maintaining safety.

Knowledge and experience in management techniques has also grown during a trend toward an increasing need to implement them. In addition to the attention-grabbing events like regional hurricane evacuations, there is a wide spectrum of other natural and manmade hazardous conditions as well as other planned and unplanned planned special events or events of national significance for which emergency transportation can be used with great effectiveness. Emergency response plans are largely developed to provide rapid short-term capacity that serve demand surges and move people away from specific threat area or reroute them away from harm. The techniques can often be readily transferable between emergencies and planned special events or events of national significance and, in some cases, to non-emergency surges in demand such as those that are a routine part of daily peak commute periods.

Highway-based modes of transportation, whether in private vehicles, buses, or freight haulers, make up the majority of travel for the movement of people and goods in the U.S. The volume of automobile driving has declined in recent years, but is expected to remain the prevalent mode of travel in the foreseeable future. Extensive infrastructure has been developed to accommodate highway modes and will provide the most abundant and readily available opportunity for movement during emergencies and events. Although many evacuation plans include multiple modes, particularly for people with access and functional needs, it should be recognized that roadway infrastructure and control is planned and designed for routine peak hour conditions. As such, significant traffic congestion is a routine part of daily commute periods. The potential for sudden and enormous demand generated under emergency conditions should be expected to overwhelm quickly the existing capacity of most networks. As such, plans for its use to move people away from hazards as well as its inability to be used when it may become the hazard (on-roadway incidents, spills, explosions, fires, etc.) should be developed in coordination with other stakeholders such as law enforcement, fire, transit, and emergency management agencies.

Another key advancement in the improvement of emergency planning has been the result of the evolution of technology and experience. One example is in evacuations. Over the past 10 to 15 years, there have been numerous major evacuation events with several high profile and highly publicized failings. Each of these has not only brought attention to the need to improve practices, they have also yielded critical knowledge and data about what to do, and how it might and could be better accomplished. Over this same time, significant advancements have occurred in knowledge and technological areas related to the ability to observe, model, and analyze evacuation traffic processes during emergency conditions, then use this information to communicate guidance information to evacuees and strategic decision makers.

Finally, it should also be recognized that knowledge, experience, and technologies on their own are not likely to address all issues and needs related to transportation operations planning for disasters, emergencies, planned special events, and events of national significance. Emergencies introduce infinite numbers of highly variable and often unforeseen conditions that cannot always be anticipated or planned

for in advance. As such, regional planning for disasters, emergencies, and events must incorporate flexibility, adaptability, and the ability to make rapid decisions during times of uncertainty. The following sections of this review provide a high-level summary and review of policies, practices, emerging knowledge related to emergency transportation and how these have been used in the past. The review highlights areas that have been recognized or, if they have yet to be implemented, are anticipated to be effective. The review does not attempt to discuss every tool or practice, rather it is intended to give the reader an overview of the major focus areas in which these practices, tools, and technologies are categorized so that they may be applied and adapted for use in any location and for any emergency.

Among the fundamental concepts in planning transportation systems for emergencies and planned special events or events of national significance is the recognition and definition of the time and space parameters that describe the extent and movement of the hazard and the people and geographic area under threat. Many factors can dictate the requirements of the response plan including how much advance warning time is available; how fast emergency procedures need to be carried out; how many people need to leave an area; how far they need to travel; and the urgency at which all of these activities need to take place. The following sections categorize practices and the way they are used in planning; operations, control, and management; communications; emerging modeling; and simulation systems.

Planning

Effective emergency operations must begin with effective emergency planning. Recent experience shows that transportation planning cannot be done in a vacuum. At a minimum, plans should be developed in coordination with other key stakeholders, including law enforcement, fire and emergency first responders, and emergency management professionals (21). Coordination of transportation systems and facilities should also extend vertically through all layers of governmental authority and horizontally to neighboring jurisdictions where overlapping road usage may be anticipated as well as to rail and maritime traffic authorities to address the potential for interruptions at crossings and moveable bridges. Some states like Florida also coordinate with entities such as National Guard personnel and equipment to support the traffic control mission of police.

Once plans are made, efforts can also be made to practice, train, and exercise staff regularly. For example, full-scale exercises are conducted annually by the Alabama Department of Transportation (DOT) to drill staff on the on the reversal of lanes for contraflow on I-65. This includes meetings to coordinate plans and ensure communication interoperability with law enforcement and other emergency management agencies. Similar live full-scale exercises have also been used in Houston to assess loading of passengers with access and functional needs on transit busses involved in the City's citizen-assisted evacuation plan. During these drills, actual busses, drivers, law enforcement personnel, and persons with access and functional needs are used to test the processes and timing to load and unload the vehicles.

Other planning practices used by agencies for regional emergency transportation planning include the development of checklists, timetables, and clear/easy-to-follow instructions to carry out traffic control set up and emergency routing orders. The development and coordination of plans for the management of transportation systems during post-event reentry has also been identified as an effective planning strategy.

Operations, Control, and Management

Among the most active areas of work in the emergency transportation field has been in the development of tools and practices for the operation, control, and management of roadways during all stages of emergencies to facilitate egress and ingress. In addition to the longstanding practice of law enforcement control and road closures to prohibit entry and restrict certain turning movements at intersections during emergencies (Cova and Johnson 2002), many other new capacity-increasing measures, have become more prevalent over the past 10 to 15 years, such as the implementation of

contraflow for evacuations and major event egress (Wolshon et al 2005). Shoulders adjacent to both the normally flowing and contraflowing lanes have also been constructed to gain additional immediate and temporary capacity. The complexities of contraflow have also brought about the development of other techniques to support its use, such as "flip down" signs in Alabama, which are used to provide guidance to drivers traveling in the reverses lanes, and "Go Trailers," which are fully stocked DOT units with all the barricades, cones, and equipment to necessary implement reversals on short notice.

Emergency practices have also emerged in urbanized areas faced with threats of terrorism or other no-notice emergencies that affect large numbers of people, even though localized. Locations such as Washington, D.C., have looked into using modified signal timings to expedite direction emergency flow, and Chicago has designated evacuation routes that must be cleared of parked cars during declared emergencies. Other logical practices such as the lifting of toll fees on roads and bridges during evacuations and closing ramps where downstream congestion is likely to occur from confluence points are also now being used.

These techniques can enhance capacity; other operational measures can also be used to decrease demand. One of these is the development of phased evacuations. While not an appropriate technique for all emergencies, particularly those that give little or no advanced warning, phased evacuations can achieve several objectives. First, they can temporally and/or spatially spread demand to lessen the potential for sudden demand surges, which can result in congestion and lengthen overall clearance time (Tamminga et al 2011). Second, phased evacuations permit evacuees in the most vulnerable and threatened areas to leave before less threatened areas do, permitting them to avoid at least some of the downstream congestion that accompanies large-scale evacuations.

Communications

The most important element to effective transportation planning and response to disasters, emergencies, planned special events, and events of national significance is communications. There are two basic facets of communications for all phases of emergency planning and response: internal and interagency communications, and communications with the general public, or public information. These two facets of communications are typically assigned to two different Emergency Support Functions: ESF 2 (Communications) and ESF 15 (External Affairs per FEMA; state EMAs may name it as "Public Information/ External Communications" or similar terms).

Internal and inter-agency communication: Internal and inter-agency communication is critical to establish and maintain a common operating platform and picture. Communication usually includes a series of steps that encompass data acquisition, analysis, decision making, guidance development, and then the transfer of that information in a timely, accurate, and useful way to emergency management and transportation personnel and other stakeholders (internal and inter-agency communications) and to travelers and the general public (public information).

Several different innovative and cost effective techniques have been used or are planned for gathering various types of data and information pertaining to transportation during emergencies. In Houston, toll-tagging data allows vehicles to be used as "probes" to gather travel time (as well as speed and congestion) information during emergencies on various routes in the region. Similarly, TRANSCOM in the greater NY/ NJ/ CT area uses the EZ Pass system transponders as probes to monitor times for passing through tunnels, crossing bridges, and traversing toll portions of major roadways. Also in Houston, METRO - the regional rapid transit system, asks its bus drivers to serve as the remote eyes and ears in the field to look for signs of trouble, congestion, road obstructions, etc., and communicate that information back to the dispatch center during emergencies. In Florida, the DOT works with Civil Air Patrol personnel to deploy aircraft that fly over evacuation routes to assess congestion. In Louisiana, joint-use flood-monitoring/traffic monitoring systems have been implemented at key locations to gather river stage

information in conjunction with traffic count and flow information (Wolshon and Levitan 2002). Each of these systems requires only modest to no capital investment.

Public Communications: Many methods can be used to communicate actionable information to travelers and response personnel during emergencies. Some of the more obvious include dedicated radio communications and radio, television, and Internet news media. Many transportation agencies have sought methods of communication that are more direct, particularly traveler information to drivers. In the case of hurricane evacuations where populations are generally aware of the threat and the threats season is well recognized, mass public information campaigns are annually undertaken that include the distribution of brochures, maps, and preparedness information in utility bills and flyers at grocery and convenience stores (NCHRP 2009). The Florida DOT collaborates with the statewide network of public radio stations to communicate emergency traveler information; and in Delaware, a considerably smaller state, the DOT purchased its own radio station, which can also be used for similar purposes. On a smaller scale, many states use low power portable and fixed-site highway advisory radio (HAR) stations. Many emergency response agencies employ Reverse 911® or similar systems to notify community members about emergency events. These calls are directed to landline phones and have limited use for travelers or drivers. Many have also initiated parallel or integrated text/email alert systems, where community members can self-register for their selection of alert categories. These can be helpful to alert drivers to emergencies, particularly if the transportation and emergency management communications people and systems are working together in advance.

Communications must be as wide and robust as practically allowable. Thus, the use of multiple redundant communication methods is desirable as is the maintenance of communication within and across agencies and jurisdictions before, during, and after emergency events.

Other Emerging Tools: **Modeling and Simulation Systems:** In addition to the variety of existing systems and methods used to plan for and carry out transportation operations planning for disasters, emergencies, planned special events and events of national significance, other new and emerging knowledge can be applied for similar purposes. Among the most significant area of advancement has been in the development and application of forecasting and analysis models to and simulation tools to predict and assess traffic conditions long before an emergency ever occurs. Today's models can be used to assess multiple modes simultaneously, predict evacuee behavior, then translate the information into travel demand and decision-making actions, and finally evaluate the benefits and costs of competing options and alternative responses during emergencies. This is a key resource area where transportation planners at state DOTs, regional MPOs, and (in some cases) local DOTs and planning organizations can provide immense value to transportation operations and emergency management personnel, while at the same time identifying potential "weak links" or other essential items that would benefit the region, and that should be included among the priorities for funding in the state or local Transportation Improvement Program and/or Long Range Plan.

Future systems currently under development are also seeking to integrate real-time capabilities that integrate remote traffic data acquisitions and permit immediate short-term predictions of potential congestion locations and durations (Strickland and Long 2012). Research is also ongoing into developing mega region models able to perform micro-level simulations that include millions of people and vehicles and cover tens to hundreds of square miles (Zhang, et al 2012) and to develop models to help select the most effective locations for the placement of law enforcement traffic control and the initiation, termination, and most effective use of contraflow operations.

Focus Area 2: Role of Public Transportation and Transportation Disadvantaged and Vulnerable Populations (people with access and functional needs [non-institutional])

The use of public transportation for regional transportation planning for disasters, emergencies, and planned special events or events of national significance , especially for transportation disadvantaged and vulnerable populations, emerged nationally as an important topic after Hurricane Katrina in 2005. Literature initially focused on examining the failures of what went wrong and the level of preparedness among cities, regions, and states across the country. Key themes include being unprepared for large-scale disasters, a lack of collaboration across jurisdictions, especially for serving the needs of transportation disadvantaged and vulnerable populations, and no clear federal guidance on the role for transit agencies including liability concerns.

Federal legislation now requires that the needs of vulnerable populations be addressed in all phases of emergencies. In this report, the term vulnerable describes people who have existing vulnerabilities (regarding age, income, disability, language, or mobility) that are exacerbated during an emergency. This definition include access and functional needs populations who are in need of additional response assistance because of additional needs in one or more functional areas, including transportation and communication (FEMA National Response Framework 2010; Matherly and Mobley 2011).

Litman (2006) explored lessons for transportation planners resulting from the experiences of both Hurricane Katrina in New Orleans and Hurricane Rita in Houston. He makes recommendations based on these lessons but also discusses the role of resiliency and key transportation issues for different types of disasters.

Several reports analyzed transportation planning efforts across different government agencies. A 2006 study published by the U.S. Department of Transportation in cooperation with the U.S. Department of Homeland Security was an extensive study based on emergency transportation efforts in states, territories, and 75 major urban regions. The research found that plans for evacuating people with access and functional needs were generally not well developed and that large-scale disasters, such as Katrina were beyond the scope of most disaster plans. The study noted that planning efforts to use transit to accommodate people with access and functional needs in the general population is a separate issue from institutionalized groups, i.e., those in hospitals, nursing homes, and prisons that are typically required to maintain their own evacuation plans based on state law (USDOT 2006).

A report in the same year by the U.S. Government Accountability Office (GAO) focused specifically on transportation-disadvantaged populations and actions needed to clarify responsibilities and increase preparedness. The GAO found that state and local government faced challenges in determining needs of diverse and constantly changing populations. Moreover, some transportation providers seemed to be unwilling to assist due to liability concerns. Despite some federal policy on the issues, the GAO found that current laws did not adequately address emergency preparedness for transportation-disadvantaged populations (GAO 2006).

In a study funded by the Federal Transit Administration, (Bailey et al. 2007) examined plans of state departments of transportation, MPOs, and transit agencies in 20 regions. Table 3.1 shows the results of the study, which indicates that as of five years ago much work was needed across the nation on creating plans that were more robust.

Topic	State DOTs	Transit Agencies	MPOs
1. General Public Involvement	1 of 15	2 of 25	1 of 13
1a. Involvement on focus populations	0 of 15	0 of 25	0 of 13
2. Accounting for the needs of focus populations	3 of 15	3 of 25	0 of 13
3. Communicating emergency Information to the public	11 of 15	14 of 25	3 of 13
3a. Communicating to focus populations	0 of 15	3 of 25	2 of 13
4. General Evacuation Planning	9 of 15	14 of 25	6 of 13
4a. Evacuation planning for focus populations	2 of 15	1 of 25	0 of 13
5. Use of the transit system in an evacuation	9 of 15	14 of 25	12 of 13
6. General Coordination Procedures	12 of 15	25 of 25	13 of 13
6a. Coordination activities targeted at focus populations	0 of 15	0 of 25	0 of 13

Table 3.1 Plans of state DOTs, MPOs, and transit agencies in 20 regions. Federal Transit Administration (Bailey et al 2007)

Reaching a similar conclusion was a 2007 report based on analyzing disaster plans across counties in upstate New York. The report found that much work was needed to plan better for utilizing transit for vulnerable populations. While New York State provided guidance to counties, the researchers found that most county plans were too "cookie cutter" and did not adequately address transportation disadvantaged and vulnerable populations and the role of transit or collaboration across counties with the exception of Radiological Emergency Preparedness Plans near nuclear facilities. (Hess and Gotham 2007)

Another study also examined planning efforts for transportation disadvantaged and vulnerable populations in Chicago, Miami, New Orleans, New York, and San Francisco. Miami stood out as a national leader based on its extensive coordination and planning efforts; however, each of the other regions also demonstrated that regional coordination in utilizing transit to assist vulnerable populations has become more important after Katrina exposed critical failures. (Renne et al. 2009)

A 2011 literature review, stemming from a national study, addressed the need for coordinated transportation disadvantaged evacuation planning in the United States. The article included a discussion of multimodal emergency response planning, people with access and functional needs assessment, institutional issues, disaster preparedness education, communications and outreach, technology in disaster and emergency planning and operations, and interaction between emergency management agencies and other government agencies (Renne et al. 2011).

A study on transportation's role in emergency evacuation and reentry identifies different travel characteristics based on a Houston plan. The five-stage classification system helps to determine different type of need amongst vulnerable groups (Wolshon 2009). Similarly, the City of New Orleans has different types of classifications for individuals that use their City Assisted Evacuation Plan (CAEP), including tourists, transportation disadvantaged residents who need a ride during an emergency, and people who need specific medical resources (Renne 2011). The CAEP, deployed during Hurricane Gustav, is identified as a best practice because it included a significant amount of planning, collaboration, and was effectively deployed to meet the needs of the most vulnerable during the emergency.

The United We Ride initiative was started by the Coordinating Council on Access and Mobility (CCAM)**,** a federal interagency council established by President George W. Bush by Executive Order in 2004. The objective of United We Ride is to "simplify customer access to transportation, reduce duplication of transportation services, streamline federal rules and regulations that may impede the coordinated delivery of services, and improve the efficiency of services using existing resources." The Secretary of Transportation chairs the CCAM and members include the secretaries of Health and Human Services, Education, Labor, Veterans Affairs, Agriculture, Housing and Urban Development, Interior and Justice as well as the Commissioner of the Social Security Administration and the Chairperson of the National Council on Disability. (United We Ride 2009).

Although emergency preparedness is not its primary mission, CCAM has made substantial progress, as noted in a GAO report:

> "…With limited interagency coordination and direction at the federal level, the United We Ride initiative and the Federal Transit Administration (FTA) have encouraged state and local coordination. For example, certain FTA transit programs require that projects selected for grant funding be derived from locally developed, coordinated public transit-human service transportation plans. The National Conference of State Legislatures reported in 2010 that 25 states had created councils to improve coordination among state and local grantees. Some states also have regional or local councils. These councils are generally responsible for identifying available transportation services, conducting needs assessments, and determining how gaps should be filled. However, participation by non-FTA grantees--which is optional--has varied, limiting these efforts." (GAO, 2011).

Coordination for emergency planning and response is not the primary mission for United We Ride. As also noted in the same GAO report:

> "…a 2009 report by the National Resource Center for Human Service Transportation Coordination found that three federal departments providing transportation services—the departments of Health and Human Services, Labor, and Education—had yet to coordinate their planning processes or requirements with the Department of Transportation. GAO found that these steps still had not occurred as of the end of 2010. These departments account for 50 of the 80 existing programs identified" (GAO 2011).

FEMA initiated its Office of Disability Integration and Coordination (ODIC) in 2009. Since that time ODIC has convened national workshops, fostered regular outreach via emails and conference calls, and established a Disability Integration Coordinator in each FEMA region. At the highest levels, FEMA has made inclusive planning central to its guidance. The Comprehensive Preparedness Guide 101 Version 2, release in late 2010, emphasized whole community planning; additional guidance released in 2011 and 2012 reinforced the meaning and implementation of whole community planning (for example, incorporating and including people with varied access and functional needs into all aspects of planning and exercises rather than in a separate annex). The degree to which this emphasis has penetrated local, regional, and state planning has not been systematically documented, as far as the study team was able to ascertain.

Another recent report provided a step-by-step process on how to a build collaborative network among diverse agencies and organizations around emergency transportation and provide a host of tools and tips to aid in that network-building effort (Matherly and Mobley 2011). The toolkit focused on communicating with vulnerable populations about emergency transportation options, however, the content, tools, and tips can be applied to any collaborative effort around regional transportation planning. The toolkit addressed five key issues for emergency management and transportation agencies:

- Defining roles and relationships among state and local departments of transportation, local emergency managers, transportation agencies, transit agencies and others engaged in emergency response planning

- Assessing the needs of the community to determine how best to communicate useful, actionable information in accessible formats

- Building community relationships among agencies and organizations that have a stake in emergency transportation

- Managing information from a transportation perspective

- Managing expectations of other agencies and community-based organizations

Focus Area 3: Emergency Management

The National Incident Management System (NIMS) provides a consistent template enabling Federal, State, tribal, and local governments, the private sector, and nongovernmental organizations to work together to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents regardless of cause, size, location, or complexity. This consistency provides the foundation for nationwide use of NIMS for all incidents, ranging from small-scale daily occurrences to more complex incidents that may require a coordinated Federal response. A core principle of NIMS is that all occurrences start and end at the local level. As such, most emergency managers have few resources under their direct control and instead, they may be considered as "conductors" of a complex "orchestra" consisting of many different resources and moving pieces. The utilization of NIMS helps coordinate the efforts of local emergency managers across multiple jurisdictions and may include a regional coordinating entity, or one or more state EMAs. Emergency managers are usually the point of contact (POC) for Department of Defense (DOD) resources as well as other federal response resources, as needed.

The *National Response Framework* is a guide to how the nation conducts all-hazards response. It incorporates 15 Emergency Support Function (ESF) Annexes that group functional capabilities and resources to provide federal support to states and federal-to-federal support for disasters and emergencies. The Federal Emergency Management Agency (FEMA) serves as the coordinator or primary agency for eight Emergency Support Functions (ESFs) and is responsible for ensuring that activities for these functions are accomplished as outlined in the National Response Framework. FEMA manages mission assignments, executes contracts, and procures goods and services for its ESF activities. FEMA realized it needed to improve its coordination with stakeholders and its operational readiness. For example, there was little evidence that support agencies were regularly included in planning meetings for an ESF mission, even though FEMA officials said that such coordination would be beneficial. Coordinating these activities with all relevant federal departments and agencies, state and local officials, and private sector entities enables the agency to effectively execute the ESF mission. The agency developed the report: *Assessment of Federal Emergency Management Agency's Emergency Support Function Roles and Responsibilities.* The report contains 11 recommendations that, when implemented, should improve

FEMA's efforts to meet its ESF roles and responsibilities. Emergency response begins at the local level and builds up to regional, state and national coordination depending on the event. Many local, regional, and state plans follow the ESF framework to build and manage their plans.

FEMA has developed many tools and resources to assist emergency managers and communities in assessing risk. These are well documented and accessible on the FEMA website. Many of these tools are also described in the FHWA "Using Highways during Evacuation Operations for Events with Advance Notice -- The Routes to Effective Evacuation Planning Primer Series". The chapter "Components of an Effective Evacuation Plan" describes 13 different tools for "Evacuation, Weather and Assessment, Monitoring and Prediction" including many FEMA tools. A very recent tool developed and released by FEMA is the Full-Spectrum Risk Knowledgebase. This is a useful tool for reviewing different types of risks and hazards, interdependencies (e.g., between transportation and various utilities), assessing consequences and mitigation approaches.

Emergencies and planned special events or events of national significance can be large and involve multiple agencies and jurisdictions. It is vital that the public/public partners and public/private partners develop joint emergency plans to help ensure coordinated prevention, preparedness, mitigation, response, and recovery efforts. FEMA is a strong proponent of the idea that planners achieve unity of purpose through coordination and integration of plans across all levels of government, nongovernmental organizations, the private sector, and individuals and families. When most incidents occur, emergency management and homeland security operations start at the local level and expand to include Federal, state, territorial, tribal, regional, and private sector assets as the affected jurisdiction requires additional resources and capabilities. Plans therefore need to integrate vertically to ensure a common operational focus. In addition, horizontal integration ensures that individual department and agency emergency operations plans (EOPs) fit into the jurisdiction's plans, and that each department or agency understands, accepts, and is prepared to execute identified mission assignments. Incorporating vertical and horizontal integration into a shared planning community ensures that the sequence and scope of an operation are synchronized. The shared planning community increases the likelihood of integration and synchronization, and makes planning cycles more efficient and effective. Shared plans also make plan development and maintenance easier. By outlining procedures and partners' responsibilities, joint emergency plans serve as the basis for a public-private partnership's ongoing coordination of preparedness efforts. The public and private sector partners can work together to incorporate each partners' risks, vulnerabilities, and capabilities into joint plans. The public-private partnerships draw on each member's expertise to address private sector vulnerabilities, needs, and capabilities in the context of public safety agencies' emergency priorities for the entire community. The public and private partnerships do not replace state and local response plans, but rather supplement plans to enable public-private coordination during emergencies.

To most individuals, emergency management is considered in terms of natural disasters, such as hurricanes, tornadoes, floods, or winter ice storms. Emergency management is also involved in manmade incidents of terrorism and acts of violence. More and more emergency management techniques are also involved in planned events and events of national significance, such as concerts, sporting events and large public gatherings. For example, in March 2005 the City of Tampa, Fla., was awarded Super Bowl XLIII. To prepare for this significant event, the city held a full-scale exercise (FSE) in accordance with NIMS. The exercise was conducted during the Outback Bowl college game, allowing the City of Tampa Office of Emergency Management (OEM) the opportunity to use a real-time event to prepare for the actual Super Bowl event. This provided evaluators the opportunity to identify gaps or areas that needed improvement prior to what the Department of Homeland Security designated a Level 1 event. The City of Tampa OEM setup a Multi-Agency Coordination Center (MACC) which included 55 federal, state, and local agencies along with members of the private sector as well as the Tampa International Airport. The

FSE scenario was based upon a terrorist cell traveling to the Tampa Bay area intending to crash a small plane into Raymond James Stadium during the Super Bowl. In addition, the FSE scenario had several ancillary events in order to engage other key agencies, including a bus crash on Interstate 275 and a terrorist with a bomb hidden underneath his coat. The Outback Bowl FSE demonstrated to evaluators that each agency used its own system to track event information; this resulted in poor information sharing among agencies. To address this, each agency deployed liaisons to the operations centers of other agencies, thus increasing the communication among all participants. In addition, special event planners instituted regular interagency intelligence briefings prior to and during the actual Super Bowl XLIII event. The Tampa Bay Regional Public Safety Sub-Committee Super Bowl XLIII After-Action Report stated that the FSE provided an excellent opportunity for the City of Tampa and its partnering agencies to test its unified command, coordination, and communication plans for Super Bowl XLIII. (Note: the OEM was in charge of planning the FSE, not in charge of the special event planning. Emergency management will typically support special event planning and planning for events of national significance, but will not lead such planning.)

Another incident occurred Saturday, January 8, 2011, when a gunman opened fire on U.S. Representative Gabrielle Giffords and a group of citizens who had come to hear her speak. The gunman wounded Rep. Giffords and twelve other people, and killed six individuals. The Pima County (Arizona) Sheriff's Department (PCSD) officers were the first responders to the tragic event. Because of the high profile and politically sensitive nature of the shooting, the PCSD employed the Incident Command System (ICS) to manage the event. This allowed the PCSD to secure the area, triage and transport the victims, and control the information flow among the incident command staff, the hospitals, and the media. In the weeks following the shooting, the PCSD further used Incident Actions Plans (IAPs) for eleven interrelated events including funerals and a visit from the President. Using the IAPs, the PCSD was able to maintain full situational awareness while still controlling the post-shooting events and activities both effectively and efficiently. According to the PCSD, the use of the IAPs "relieved the stress of having one person plan each event over the course of the week."

Most emergencies occur with little if any warning, while many planned special events or events of national significance are carefully planned and orchestrated. In either case, pre-planning for what may go wrong can alleviate and mitigate the stress should something unforeseen occur. In disasters law enforcement and even relief workers often might not be able to reach everyone in harm's way immediately. The American Red Cross published the guide entitled: *Preparing for Disaster*, a vital step-by-step instructional document to assist families with evacuation planning before an event. Additionally the Florida Division of Emergency Management published: *Tips for Evacuating Vulnerable Populations,* which can be consulted and used before evacuations occur. Being prepared for an event also can help with the recovery after the event.

The last 10 years have seen a number of disasters and emergency events occur around the world. From the terrorist attacks on 9/11 (2001), to wildfires in California (2003), to the numerous hurricanes experienced in the United States during 2004 and 2005, to the earthquake in Haiti (2010) and the tsunami and subsequent nuclear plant near-meltdowns in Japan (2011). These events not only caused massive destruction and loss of life, but also disrupted the everyday way of life for many families and businesses as well. The Business Civic Leadership Report, A Decade of Disasters, provides a look at U.S. events from the business sector and lessons learned from each significant event. One such lesson learned was "our economy is so interconnected that a disaster in one region can have major secondary impacts on people throughout the country or region."

International disasters such as the devastating tsunami in Japan and the earthquake in Christ Church, New Zealand are instructive as to disasters and preparedness. For example, Japan is widely known for its earthquake preparedness, including preparedness for tsunamis, but the scale of this event, and its impact on nuclear facilities near coastal areas, demonstrated that preparedness scenarios and infrastructure

hardening must look beyond the "comfortable" notions of preparing for what has occurred in the past. Similarly, the Christ Church earthquake occurred in a region that is not "typically" subject to earthquakes; its building codes were not established for that level of risk, and liquefaction greatly increased the extent of damages. While these and other international examples provide lessons as to risks and hazards, they are less informative as to the practices of organizational structures and interactions and interactions among agencies and organizations that form the crux of the U.S. experience in multijurisdictional planning for disasters and emergencies. For example, some countries have a single police force, unlike the U.S. model with multiple jurisdictions and multiple layers of authority. Therefore, the case studies and interviews developed for this project focus on U.S. examples.

Focus Area 4: MPOs and RPOs

In large metropolitan areas and in clustered rural counties, regional coordination and planning have been proven essential for effective regional transportation planning, according to the literature reviewed for this topic area. MPOs, Regional Councils of Government, and Rural Planning Organizations (RPO), state and local development organizations, and other regional entities serve an important role as conveners of meetings around highway, transit, safety, and (sometimes) security projects. (Security projects are not in the typical purview of MPOs. However, in some regions applications and disbursements of Urban Area Security Initiative (UASI) grants are coordinated through MPO committees or subcommittees. Other regions establish separate mechanisms.)

MPOs represent local, regional, and national interests in the transportation planning process. Congress vests MPOs with the authority to plan for regional and national transportation needs in urban areas with populations of more than 50,000 and to set funding priorities for highway, transit, safety, and security projects receiving federal aid. Councils of governments are known by many names, such as regional councils, regional commissions, regional planning commissions, planning district commissions, and development districts. A COG addresses many regional areas of shared interest, including transportation and (sometimes) hazard mitigation and emergency planning.

One detailed report on a Federal Highway Administration workshop, (RSG, Inc. 2008) concluded that the MPO's role of convener of other agencies has been successful in planning around emergencies and natural disasters. A recurring comment in the workshop report, however, was the difficulty MPOs often have with communicating and coordinating with other agencies. Many also have a low profile in their communities. Suggestions for raising an MPO's level of visibility and increase its relevance in emergency planning included:

- Establishing security/safety criteria or points in funneling federal money for transportation projects; and

- Helping with funding on replacing bridges and roads in the recovery effort.

Another series of articles (Hescock 2009) reported on the Atlanta Regional Council's (ARC) effort to develop a Regional Evacuation Coordination Plan (RECP). The RECP Planning Commission used a three-phased approach: a workshop with stakeholders in the region, including emergency management agencies, first responders and people with access and functional needs and their service providers; a series of analyses on each of the 10 participating counties' hazards, behaviors, transportation, etc.; and the development of the plan. The plan includes a "First Hour Checklist" which serves as a stand-alone

document and individualized analyses for each county. The RECP has been tested and more tests/exercises are planned (City of Atlanta Online 2010).

TCRP Report 150 provides tips sheets that explain the roles of both MPOs and RPOs and how to engage strategically these planning agencies in building community and regional networks around emergency transportation options (Matherly and Mobley 2011).

A U.S. Department of Transportation report (2009) on a national strategy for recovering from disasters complements the National Response Framework and sets forth several basic planning activities for agencies and organizations involving regional coordination:

- Develop a Business Impact Analysis.

- Develop a Continuity of Operations Plan (COOP) and keep it up to date.

- Enter into mutual aid agreements with other transportation stakeholders.

- Coordinate with government and other transportation industry stakeholders.

- Enhance information sharing by sharing recovery plans with National Infrastructure Coordination Center's (NICC) Protected Critical Infrastructure Program (PICC).

- Train staff to serve as Subject Matter Experts (SMEs) in the response and recovery phase and to coordinate with government officials. Task essential employees in advance so that expectations and requirements can be set in advance.

- Evaluate insurance coverage.

- Develop extensive contact list.

- Get to know lead decision makers for all transportation systems and infrastructure in the region.

- Understand who is responsible for damage assessment (public and private).

- Plan for long-term debris removal.

Another report on how regional coordination can enhance emergency preparedness (GAO 2004) highlighted transportation's role in preparedness and response in regional collaboration for an emergency. Two examples were:

- TRANSCOM as part of the 9/11 responses. TRANSCOM is a multi-state collaborative of transportation organizations (18 independent transportation and public safety agencies in Connecticut, New York, and New Jersey, including NY Port Authority)

- LA TEW (Terrorism Early Warning Group), Los Angles, Calif.

A report on the fiftieth anniversary of the Metropolitan Washington Council of Governments (2007) used a policy analysis approach to demonstrate how regional cooperation was an essential component of addressing public safety threats and emergencies especially in multijurisdictional and densely populated

locales. Although this report did not specifically address transportation issues, it set forth principles that would apply to transportation:

- The COG regional cooperation model can serve as a model for the nation;

- Mutual aid agreements can be expanded and enhanced;

- Everyone must be at the decision-making table; and

- Technology and communication must be integrated.

Another type of regional planning organization is a Development Organization formed by clusters of rural counties for the purpose of collaborating in areas of shared interests, such as economic development, transportation, and natural and infrastructure assets. In one NADO (2010) report from Kansas, Patricia Clark, Kansas state director for the U.S. Department of Agriculture Rural Development, succinctly expressed the need for regional cooperation and collaboration:

"To find a common cause, communities have to begin to transcend their traditional rivalries and competitiveness with respect to the idea that each community has to have the same of everything. If we are unwilling to work with our neighboring communities or shift how we have always thought of ourselves, we are giving up our future."

The Commonwealth of Kentucky is one of several states that employ Area Development Districts (ADDs) to provide regional planning coordination in rural areas. The 15 ADDs are active members of the Kentucky Outreach and Information Network (KOIN), a national model for building collaborative networks to help mitigate, plan, respond to, and recover from disease outbreaks, natural and manmade disasters and terrorism. The KOIN has been tested repeatedly as a means of relaying critical information in weather-related emergencies, including the worst ice storm in the state's history, flooding, and hurricanes.

Focus Area 5: Utilities in Disasters, Emergencies, and Planned Special Events or Events of National Significance

Many infrastructures are needed to successfully respond to and recover from disasters, emergencies, and planned special events or events of national significance. Failure of one infrastructure system can be a significant event in and of itself. The importance of the various infrastructures is recognized by the FEMA (2008), which assigns them to ESFs. For example, ESF 1 is transportation; ESF 2 is communications; ESF 3 is public works and engineering; and ESF 12 is energy. FEMA matches the ESFs to the emergency management functions: direction, control, and coordination; information collection, analysis, and dissemination; communications; population warning; emergency public information; public protection; mass care/emergency assistance; health and medical services; and resource management (FEMA 2010). However, the interdependencies among the infrastructures are not always well understood or appreciated until an event occurs. Examples of such events include snow and ice storms, blackouts, earthquakes, Hurricanes Katrina and Rita, and tabletop exercises, which are discussed further below as well as lessons learned that may be applicable to other agencies.

A 2011 snowstorm in Connecticut caused a power outage to more than 807,000 customers and revealed that the State Response Framework and Natural Disaster Plan inadequately addressed power outages. No formal set of procedures or responsibilities were outlined in these documents for extensive power outages, although the Natural Disaster Plan indicated that the Department of Public Utility Control was

responsible "for ensuring that utilities have the resources to mobilize maintenance and repair forces" (p. 15). The restoration process was hindered by the state of the transportation system, which needed snow removal and clearance of downed trees. Recommendations after the event included: (1) training employees of other sectors on utility and live wire identification, (2) improving state planning for power outages, and (3) having interoperable radio communications (Witt Associates 2011).

A 2008 ice storm in New Hampshire left more 400,000 customers without power, with outages spanning hours to two weeks. The number of people affected was estimated at over 800,000 - approximately 63 percent of the state's population. To address the situation, 81 local Emergency Operation Centers (EOCs) and 51 shelters were opened. In addition to dealing with event scales that overwhelmed utility companies' plans and capabilities, this event highlighted the issue that the coordination of emergency response plans could be difficult if some entities were not required to make the plans available in writing (New Hampshire Public Utilities Commission 2009).

The August 2003 Blackout crossed Michigan, Ohio, Pennsylvania, New Jersey, New York, Connecticut, Vermont, and into Canada, causing massive transportation system disruption, people trapped in elevators, and many other impacts. This large scale event emphasized the need to have emergency response plans that address prolonged power outages/emergencies; ensure that employees know their emergency responsibilities; develop plans for "no communication" events; account for pedestrians as well as vehicles; stockpile supplies and equipment; and plan for all types of emergencies. Further recommendations included ongoing agency coordination, establishing informal relationships, keeping landline phones, and prioritizing generator deployment (DeBlasio, Regan et al. 2004).

The Northridge Earthquake in 1994 caused significant damage to the transportation infrastructure and tested Caltrans' readiness for outages in other infrastructures. Caltrans' TMC had backup power generators and landlines for telecommunications. Pagers, fax machines, and electronic data sharing via computer were used extensively, especially while the landline system was temporarily disrupted. Providing information to the public was key to mitigating the congestion impacts. Caltrans and other agencies involved the media in disseminating information on detours and transportation alternatives, and established a new phone service to disseminate commuter information. Telecommuting options and special discounts offered by the utility companies were integral to managing transportation demand (DeBlasio, Zamora et al. 2002). In a study of earthquakes in Japan, telecommunications were found to highly influence other infrastructures during the emergency response, second to the transportation infrastructure (Tsuruta, Goto et al. 2008).

In Hurricane Katrina, levees failed, which caused failures in the energy, communications, water, and wastewater infrastructures. Their failures, in turn, caused medical, public health, emergency response, and law enforcement to fail (Tanali and Harrald 2006).

A tabletop exercise called "Blue Cascades III" posed an earthquake and tsunami with subsequent power outages, traffic gridlock, and damage to the power, transportation, water and sewer, and natural gas and fuel transmission infrastructures to representatives of five states and three Canadian jurisdictions. The exercise led to more than 100 findings, including: (1) cascading and simultaneous infrastructure failure effects were not well understood; (2) EOCs might be in the impact area, with no backup EOC identified; (3) many had trouble envisioning a lack of communication systems; (4) the media had an important role; (5) regional stakeholders had a good public-private cooperative relationship; (6) cross sector information sharing was needed; and (7) a regional evacuation plan that could operate in gridlock and without power and communications was not identified (Pacific NorthWest Economic Region and Puget Sound Partnership for Regional Infrastructure Security 2006).

Some of transportation's immediate dependencies on power include traffic signals, transit vehicles, tunnel lights and ventilation, intelligent transportation systems, cameras, loop detectors, Variable Message Signs (VMS,) and pumps to prevent flooding in tunnels (DeBlasio, Regan et al. 2004). These

dependencies are fairly clear from a day-to-day perspective. However, emergency response activities (e.g., calling for mutual aid, coordination activities, advising and communicating with the public and media, transferring information within and among agencies, and contacting employees) often assume that the telecommunications system is operational (Wallace, Boyd et al. 2010) and overlook this system's dependence on power.

The events discussed above were of magnitudes that far exceeded utilities' emergency operating plans. These plans often involve contacting restoration crews from other regions through mutual aid agreements. Restoration occurs according to pre-established priorities, such as "(1) Key communication facilities (Emergency Broadcast, etc.); (2) selected federal, state and local facilities (selected essential services such as fire, police, airport FAA, military services, etc.); (3) hospitals; (4) fresh water treatment or pumping facilities; (5) waste water treatment facilities; (6) critical food storage/distribution centers; (7) schools designated as emergency shelters; (8) banks; (9) large business and media; (10) individual customers with medical needs (White Seal) (11) remaining customers" (Chantrill 2011, 12). It is important for emergency managers to recognize that although the emergency broadcast system may be first on the priority list, the people who need to receive the message (local residents) may be last (Chantrill 2011).

Emergency management and transportation agencies must account for these restoration priorities in their plans. Emergency plans may need to be enhanced for power failures, loss of telecommunications, and loss of Internet connectivity, which are listed in technological hazards, and winter storms, which are mentioned in natural hazards (Wallace, Boyd et al. 2010). Furthermore, COOP can be developed and be different from emergency response plans (Boyd, Caton et al. 2005). Boyd et al (2005) indicate agencies should be prepared for up to 30 days of temporary operations. They also surveyed state DOTs, Traffic Management Centers (TMCs), and transit agencies to identify the types of emergencies most likely to result in the need for COOP capabilities; these events largely overlapped with those previously mentioned in this paragraph. In developing and modifying these plans, agencies must be aware that government agencies have priority telecommunication use through the Government Emergency Telecommunications Service (GETS) and Wireless Priority Service (WPS) (DeBlasio, Regan et al. 2004).

Focus Area 6: Borders and Perimeters – Considerations for Regional Transportation Planning for Disasters, Emergencies, and Planned Special Events or Events of National Significance

One of the most famous quotes about emergency management is "All disasters are local." The impact of an emergency can spread far beyond a city, town, county, parish, special district, regional group, or state. But, local government leaders are initially and ultimately responsible for overseeing all four phases of emergency management: preparedness, response, recovery, and mitigation within their community.

The first response to any disaster, large or small, must be by local authorities: firefighters, law enforcement, emergency medical services, public health authorities, etc. (EPA 2011). Depending on the scale and type of emergency, neighboring communities and volunteer agencies can provide additional resources as required.

When local governments in the U.S. are situated along the international borders of Mexico and Canada, it has sometimes been easier, quicker, and cheaper to look to their international neighbors and vice versa to expedite additional resources to help save property and lives in an emergency. For years, most of these arrangements were informal agreements that one community had with its cross border counterpart. Two significant events have changed this informal arrangement, however (Fox 2005).

The North American Free Trade Agreement (NAFTA) was implemented on January 1, 1994. It was designed to lower tariffs between the U.S., Canada, and Mexico. The result of this agreement led to a significant increase in border populations, especially in Mexican municipalities. Increasing populations, poor living conditions, and substandard infrastructure in these areas have amplified vulnerability and exposure to the effects of natural hazards. Illegal dumping of hazardous waste, the trans-boundary shipping of hazardous materials, and enforcement of environmental policies within the region have compounded the risks of living and working within these areas (Kamel and Hoffman 2005).

The second event that changed the way border region communities interact was September 11, 2001. The outcomes of the terrorist incidents led to increasingly tightened borders. Maintaining enhanced security hindered the ability to cross the border quickly to provide assistance in the event of a chemical emergency or a natural disaster (GNEB 2010).

U.S. and Mexico

Hurricanes, mudslides, tornados, wildfires, and earthquakes and other natural disasters are difficult to overcome no matter where they happen, but when they occur along the U.S.-Mexican border, the difficulties are multiplied (Environment News Service 2008). In order for communities located within the border region to work together they often must work through two languages, at least two sets of laws, and completely different emergency management plans, protocols, and procedures.

Ten states and tribal lands of 26 federally recognized tribes adjoin the 2,000-mile U.S.-Mexican border. The four U.S. States are California, Arizona, New Mexico, and Texas. The six Mexican states are Baja California, Sonora, Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas. Within this region are 23 U.S. counties and 39 Mexican municipalities. By 2020, the border population is projected to reach 24.1 million (GNEB 2012).

Several initiatives have been undertaken since the 1990's to encourage the development of more formalized emergency management-related agreements. Although mainly focused on environmental and public health issues, the US-Mexico Border Environment Program (Border 2012) brings together many emergency management and transportation stakeholders for border region planning. The U.S.-Mexico Joint Response Team (JRT), established by the 1983 La Paz Agreement, is composed of representatives from U.S. and Mexico federal, state, and local agencies responsible for emergency planning, training, and exercising in the border region. These plans provide local emergency response teams with a mechanism for addressing issues and concerns, consisting of cooperative measures and recommendations, including emergency response planning, exercises, and training.

The draft Border 2020 Program is the latest environmental program implemented under the 1983 La Paz Agreement. It builds on the current Border 2012 Environmental Program, emphasizing regional, bottom-up approaches for decision making, priority setting, and project implementation to address the environmental and public health problems in the border region (GNEB 2010).

In August 2005, two tank cars ruptured 10 miles south of the international border in San Lazaro, Mexico, releasing 24,000 gallons of sulfuric acid into the Santa Cruz River. The planning and preparedness as a result of the Border 2012 initiatives enabled an efficient bi-national response to the incident (EPA 2006).

The Good Neighbor Environmental Board is an independent U.S. Presidential advisory committee that was created in 1992 under the Enterprise for the Americas Initiative Act, Public Law 102-532. It operates under the Federal Advisory Committee Act (FACA), and its mission is to advise the President and Congress of the United States on "good neighbor" environmental and infrastructure practices along the U.S. border with Mexico. One of the key focus areas is emergency response and planning. The nine areas that the Board is focusing on include:

Ensure that robust emergency response capabilities exist and are supported adequately along the border. This includes equipment, training, and exercises.

Resolve liability issues for cross-border emergency responders.

Develop effective procedures to expedite the entry and exit of emergency responders during incidents and plan for evacuations across the border.

Strengthen communication systems along the border to ensure that federal-federal agreements on such issues are implemented at the state and local levels where possible. This includes testing radio and cellular telephone communications between Protección Civil and U.S. federal, state, municipal, and tribal emergency responders.

Fully implement the Agreement between the United States and Mexico on Emergency Management Cooperation in Cases of Natural Disasters and Accidents signed by Secretary Rice and Secretary Espinosa on October 23, 2008.

Adapt the National Response Framework (NRF) Support Annex on International Coordination to enable rapid response to natural disasters in the border region.

Build capacity so that the necessary technology and experienced decision makers, including new players at all levels, are available in the field during a response.

Clarify and expand Sister City Agreements. Encourage sister city communities to expand both the substantive and geographic scope of their agreements. Substantive scope could be expanded to include pollution, natural events, or other incidents as found in the NRF.

Strengthen both informal and cross-agency bi-national collaboration. Continue to work with the DHS and its Mexican counterparts to enhance capabilities for rapid, cross-border emergency response mobilization (GNEB 2010).

The EPA has a Joint Response Team, which is a bi-national team of federal, state, and local agencies from the US and Mexico that is responsible for coordinating emergency preparedness and response along the US / Mexico Border. The Team conducts bi-national exercises, chemical risk analyses, and training for local first responders and also updates the local sister city plans.

U.S. and Canada

In the 1990's, FEMA Regional Emergency Management Advisory Committees were established to facilitate the development of regional cross-border emergency assistance agreements. These committees were organized by geography: Eastern Regional, Prairie Regional, Central Regional, and Western Regional Emergency Management Advisory Committees. Through these groups, cross border state to province agreements have been developed and the groups work together on preparedness, response and recovery initiatives (DHS 2011).

To enhance their regional capabilities, six New England states (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut) and five Eastern Canadian provinces (New Brunswick, Nova Scotia, Quebec, Prince Edward Island, and Newfoundland & Labrador) have entered into an International Emergency Management Assistance Memorandum of Understanding (IEMAC). IEMAC was successfully implemented in February 2004 during a snowstorm in Nova Scotia known as "White Juan," so named because it started as a tropical storm and turned to snow when it hit Nova Scotia. Earlier, Hurricane Juan had done a great deal of damage in the province. Both Maine and New Brunswick provided snowplows in response to a request under the MOU (CICS 2000).

Emergency Management: Cooperation. The U.S. and Canadian governments signed an agreement on December 12, 2008, to establish a consultative group to promote emergency management cooperation and consistency among federal state, provincial, and local governments.

In 2009, the Deputy Minister of Public Safety Canada, and the Deputy Secretary of the U.S. Department of Homeland Security developed a policy framework to manage the movement of goods and people across the Canada and US border during and after emergencies.

The framework provided six goals:

Develop joint threat and risk assessments

Advance initiatives that manage risk while facilitating the movement of legitimate goods and people; and enhance their ability to assist one another in times of emergency.

Endeavour to share information relevant to preventing people or goods that threaten our mutual safety and security from entering either nation or from crossing their shared border

Where national laws inhibit or prohibit such sharing, strive to ensure that the separate systems prevent entry of dangerous people or goods to either country or across the shared border.

Expand integrated law enforcement operations along our shared border and waterways

Seek to leverage resources where possible by exploring models for joint or shared border facilities, equipment, and technology, as well as for cross-designation of personnel as appropriate." (DHS 2009)

US and Canadian first responders and emergency managers plan, train and exercise together through additional mechanisms such as through the fifteen Integrated Border Enforcement Teams which deal with cross-border threats and criminal organizations. In August of 2011, the US Coast Guard led an exercise involving the US and Canadian forces' response to a terrorist attack on a ship on the Detroit River between Detroit, Michigan, and Windsor, Ontario. The scenario involved 500 passengers, an 800,000-gallon oil spill, and mass casualties (McCarter 2012).

Note: Puerto Rico and the U.S. Virgin Islands are U.S. territories; FEMA Region II based in New York is responsible for coordination. Similarly, FEMA Region IX in Oakland, CA, supported by the FEMA Pacific Area Office in Honolulu, HI, is responsible for coordination and logistics with the State of Hawaii and "Islands of U.S. Interest in the Pacific Ocean" including American Samoa, the Territory of Guam, the Commonwealth of the Northern Marianas, the Pacific Marshall Islands, and the Federated States of Micronesia. These are not considered as border issues; emergency coordination with islands has been identified as a unique topic of interest that is beyond the scope of this project.

Correctional Facilities

Correctional facilities require special consideration when planning for emergencies as incarcerated populations must be addressed differently than planning for general populations. As of 2000, there were 1,668 Federal and privately operated correctional facilities throughout the United States. Emergency planning for each of these facilities requires the coordination of emergency managers, law enforcement, Department of Corrections, prison superintendents, and other stakeholders at the federal, state, and local levels in order to ensure the safety of the prisoners as well as the public.

Military Facilities

In January of 2009, DHS published the Integrated Planning System (IPS), which established a standardized and national approach to emergency planning. The IPS elucidated a planning process for Federal departments and agencies to use in the development of emergency planning documents. This process has assisted in the development of plans that are more consistent with their state, regional, and local emergency management counterparts and has enabled better coordination and collaboration at all levels of interaction.

The Fort Belvoir US Army Base is located on an 8,656-acre parcel in Fairfax County, Virginia. Over 160 Army, Department of Defense, and other federal Agencies are located in Ft. Belvoir. Fort Belvoir's emergency manager serves on the Local Emergency Planning Committee for Fairfax County, Virginia and coordinates regularly with numerous federal, regional and local emergency management entities within the National Capital Region. The base has reciprocal mutual aid agreements in place; during the "Snowmageddon" blizzard of 2010, the base had to use mutual aid agreements with nearby jurisdictions for snowplows to remove the snowdrifts that were as high as six feet in some places.

Tribal Lands

Because of their unique status as sovereign nations, federally recognized Tribal governments are important stakeholders in Federal, state, regional and local emergency planning. Nineteen of the tribal nations are each larger than the state of Rhode Island, and 12 have a land base larger than the state of Delaware. Tribal governments in many rural and isolated locations serve as first responders and law enforcement authority in Native and non-Native communities in the United States.

Focus Area 7: Freight Issues

Resiliency of the freight system is an important aspect to ensure minimal impact of disasters on the economic wellbeing of the region. Resiliency of the freight system has been defined as its "Ability to *recover* from or *adjust* easily to misfortune or change." Resiliency ensures reliable delivery of needed goods while also ensuring confidence among the business community on continuity of business operations. Ability for the freight transportation system to absorb shocks and reduce the consequences of disruptions depends on how the infrastructure, the managing organization, and the system users, are prepared and capable to efficiently respond to adverse conditions.

In a report by the United States Government Accountability Office (2007) that reviewed emergency preparedness of ports, found that most port authorities planned for natural disasters separately from planning for homeland security threats. In addition, there are no federal requirements to prepare for natural disaster resulting in varied approaches and methods from port to port. Based on lessons learned due to disasters:

There is increased coordination between the ports and the federal maritime agencies, such as the U.S. Coast Guard, the Maritime Administration, and the U.S. Army Corps of Engineers to strengthen ports' resiliency, as well as educate stakeholders about federal resources for port recovery efforts. But there is limited communications across ports.

The Maritime Security Act of 2002 and the establishment of the Area Maritime Security Committees (AMSC) are the basis for all Port Security and Emergency Preparedness within the Port Industry. The DHS/FEMA 2007 Port Security Grant Guidance included the requirement (as a condition for the port region to receive funding) the development of a Port-wide Strategic Risk Management Plan for the modes interacting within the Port area. This would include Port operations, vessel traffic, trucks in and out of port complex, and freight railroads.

American Association of Port Authorities (AAPA), a nationwide industry group is facilitating sharing of best practices and lessons learned from recent natural disasters.

Another industry group, the Gulf Intracoastal Canal Association (GICA), has worked closely with the Corps, Coast Guard and other maritime agencies to implement new practices for a more efficient response to maritime related incidents. For example, a special Logistics Support Center is set up during response times for the sole purpose of assisting the Corps and Coast Guard with contracting special equipment, including water, fuel and crane barges, towing vessels, pumps, and generators.

Seven port authorities reported purchasing or arranging for alternative power supplies that could be used during an outage.

Plans have been developed to ensure quick return/access to workforce to have minimum disruption on operations post disaster and fast track recovery.

Further, Brown (2009) identified the lack of freight transportation plans in State and County emergency operations plans. The study suggests the need for governments to conduct vulnerability analyses and continued coordination between public and private stakeholders. A systematic study conducted by MIT (2009) found that a good freight resiliency plan needs to include a recovery plan, string relationship between public/private entities, increased communication capabilities, mechanisms for fast-tracking recovery, ability to actively manage scarce public resources, emphasis on economic recovery and federal guidelines. Mechanisms for fast-tracking recovery include strategies such as relaxing stringent legislation or regulations to provide flexibility. For example: driver hours rules can be loosened for a period of time to ensure sufficient capacity, competitive bidding requirements can be relaxed for certain critical

reconstruction projects that enable the economic recovery, or the use of restricted lanes can be used for alternative sources like trucks on HOV lanes.

A few states that have recognized this gap, such as Texas (TxDOT 2011), Washington (Goodchild et al. 2009), Wisconsin (Adams et al. 2010; Wisconsin DOT 2011), and The Gulf Coast (Swigart et al. 2011) have developed regional freight resiliency plans. Most of these plans pivot on the following key concepts that have been tabulated in Table 1 (Chilan et al. 2009).

The first step of developing a resiliency plan would require undertaking a region wide vulnerability assessment. This would involve assessment of vulnerability not only from the transportation system perspective but also assess the goods that will be affected and analyze the economic vulnerabilities. For example, the state of Washington developed a GIS-based statewide freight transportation network model; through this, they identified that any disruption on the freeway network adversely affects the distribution of potatoes and diesel fuel, and its effects on the economy.

The state of Wisconsin has systematically attempted to implement key concepts shown in Table 2 across their freight resiliency plans. They have developed Continuity of Operations and Continuity of Government plans to ensure continuity of functionality during major disruptions. In fact, Wisconsin implemented a 511 Traveler Information System, to provide better communication. Madison-area has developed a "Blue Route", which is an alternate route signing concept that is used to direct travelers when a major incident disrupts the interstate for a lengthy period. This has been explained in Chapter 11 of the Wisconsin DOT plans to "Promote Transportation Security":

"When a major incident occurs on I-39/90/94 around Madison, electronic message signs will instruct interstate travelers to follow the Blue Route. Static Blue Route signs have been installed that lead drivers off the interstate and along the Blue Route. The electronic signs can be activated remotely, allowing the State Patrol and other responding agencies to better focus their resources on the critical incident scene. The Blue Route uses US 51 (Stoughton Road) from US 12/18 (the Madison Beltline) at the south to its intersection with I-39/90/94 at the north."

Property	Examples of Applications of Resilience [*Adapted from Chilan, Goodchild and Pitera (2009)]			Contribution to Freight Transportation System Resiliency
	Physical Infrastructure Dimension	Managing Organization Dimension	User Dimension	
Redundancy	Availability of multiple and alternate routing options	Multiple information sources and points of delivery	Multiple parts and materials suppliers; information backed up on distributed servers	Promotes flexibility; supports robustness
Autonomy of Components	Ability of highway system to function when air space closed; independent signal controls for each intersection	Independence of functional units in an organization, e.g., approvals and decision making can be independent of established hierarchies	Independence of functional units in an enterprise, e.g., procurement, billing, manufacturing, and distribution	Supports system operability despite the failure of individual system components; supports robustness
Collaboration	[Not applicable at the infrastructure dimension]	Good internal communication across divisions and external communication with system users; leadership across all levels of the organization	Public–private partnerships to build relationships between organizations	Supports innovative problem solving, reduces miscommunications, spreads risk across groups
Efficiency	Network designs that reduce travel time between origin and destination	Use of effective mechanisms to prioritize spending within the organization and on infrastructure	Coordination across the supply chain with relationships built across the different parties	Allows resources to be spent on activities or projects that provide most benefit to the users

Property	Examples of Applications of Resilience [*Adapted from Chilan, Goodchild and Pitera (2009)]			Contribution to Freight Transportation System Resiliency
	Physical Infrastructure Dimension	Managing Organization Dimension	User Dimension	
Adaptability	Designed with short life-spans and the intent for regular replacement; ability to assume diversity functions (e.g., adaptable-use HOV lanes)	Familiarity of roles and responsibilities across levels of the organization; cross-trained employees; leadership can be engaged at all levels	Ability to postpone decision making and shipping; build to-order business model	Promotes flexibility and system efficiency; supports robustness
Interdependence	Seamless mode transfers; intermodal facilities	Relationships are established across separate, but related agencies and within agencies; mutual understanding of the value and benefit from interaction	Standardization of parts and interchangeability	Exhibits smooth connections and transitions across parts of the system; promotes system efficiency; spreads risk across the system to reduce risk

Table 3.2. Freight Resiliency Concepts

The first key finding is that the transportation sector has a vulnerability to direct damage from earthquake and flood hazards. Next, the study revealed that the transportation sector is vulnerable to impacts from interdependent systems, especially when it comes to the electric power sector. The final key finding is that the transportation sector can enhance its resilience to earthquakes and floods through more integrated planning across modes by taking advantage of its existing redundancies.

For example, in the Gulf Coast the waterways are a key part of the resiliency plan and provide redundancy to the surface transport. The Texas Department of Transportation (TxDOT 2011) has identified four main strategies to ensure resiliency in their freight system. They are:

Strategy 1: Support planning for a resilient, well-maintained freight transportation network

Incorporate freight resiliency into traditional transportation planning and programming

Include other modes in planning efforts to increase awareness of system wide needs

Strategy 2: Prioritize infrastructure enhancements to improve the freight resilience

Use corridor assessments to identify operational bottlenecks and physical constraints

Investigate ways to fund improvements needed for other modes

Strategy 3: Improve access to data, information, and people for effective resiliency planning

Strategy 4: Communicate before, during, and after events.

Rail is another integral component of the nationwide freight system. It has tremendous capacity for moving goods and supporting resiliency. Because of the nature of some of the goods it carries, it can also pose a potential threat to communities in cases of derailment. The Federal Railroad Administration Railroad Safety Act and Chemical Security Safety Act provide the regulatory framework for the transport of hazardous materials on railroads, such as Toxic Inhalant Hazard (TIH). Analogous regulations apply to trucking, inland waterways, and pipelines.

Overall, researchers have found that 1) improved responsiveness of operations (e.g., directing freight traffic to pre-identified alternate routes), 2) infrastructure maintenance and repairs based on vulnerability assessment to limit the effect of a disruption, and 3) adding capacity and providing flexibility (e.g., additional lanes, intermodal connection capacity, or bridges at river crossings) provides resiliency to the transportation system. Concurrently, communication, plans for continuity of operations, collaboration, and interoperability provide resiliency at an institutional level. Like earlier studies (Ortiz et al. 2009; Chilan et al. 2009; Brown 2009; MIT 2009) the following gaps were identified:

There is a need for a national guidance for resiliency plans. Countries like the United Kingdom and Australia (Commonwealth of Australia, 2011) have developed such documents. Due to lack of national directives and guidance, several states have developed statewide freight resiliency plans, based on their own initiative. Since the freight system has a significant impact on the national economy, there is a need to study freight resiliency at a more regional level across state boundaries.

MPOs can use transportation-planning models that capture the dynamic properties of the system to study resiliency in the freight system.

Governmental agencies should incorporate additional system capacity into planning and direct engagement (for example, Wisconsin DOT, Washington DOT and TxDOT) with the freight community to understand their needs to enhance resilience.

Finally, DOTs and MPOs need to coordinate their efforts to understand local needs and capacity to improve resilience.

Focus Area 8: Collaboration

Collaboration is defined as the "purposeful process of working together to plan, to create, and to solve problems and/or manage activities" (Campbell, et al 2005). It is the cornerstone of many types of activities, especially those requiring high levels of interaction for mutual gain as well as high levels of trust of others. The first step in the Comprehensive Preparedness Guide 101 Version 2 (released by the FEMA in 2010) is to "Form a Collaborative Planning Team."

Research on collaboration has identified the following benefits that directly relate to regional transportation planning for disasters, emergencies and planned special events or events of national significance:

Responding to public needs that require multimodal or multijurisdictional strategies.

Utilizing new technologies to integrate system and traveler information that crosses modal and jurisdictional boundaries.

Improving the probability of securing new funding for your region or organization (by expanding the constituency base for your proposal)

Preparing for both planned and unexpected events (such as freeway reconstruction and natural disasters) that could disrupt the transportation system (Campbell, et al, 2005)

TCRP Report 106/ NCHRP Report 536 "From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making" (Campbell, et al 2005) identifies 10 steps to successful collaborations, includes a self-assessment guide for existing collaborations, and identifies strategies and tools for collaboration, such as developing a purpose and needs statement, agreeing on language and terms, and establishing a common work/ activities program.

Some regions have extended collaboration into regional transportation operations collaboration and coordination (FHWA, undated). Regional collaboration and cooperation evolves from a focus on problem solving to a focus on integrated transportation systems. Such integrated systems greatly facilitate emergency response coordination as well as major planned special events or events of national significance coordination. For example, the Transcom system in New York, established in 1986, showed its value on 9/11/2001 in providing information on transportation system assets and options to the public as well as to regional partners. (FHWA, undated.) Likewise, the regional transportation and emergency management communications, incident response, and planning protocols developed over time in the Washington, DC region proved their effectiveness in successfully managing the 2009 Presidential Inauguration – the largest event in the nation's capital's history (National Capital Region, 2009 Presidential Inauguration January 17-21, 2009 After Action Report Summary).

The five major elements for collaboration are structure, process, products, resources, and performance. "Regional Transportation Operations Collaboration and Coordination- A Primer for Working Together to Improve Transportation Safety, Reliability and Security" identifies action steps to achieve each major element, as well as a range of approaches (from less formal to more formal) to achieve each element. For example, three action steps for "products" include "1) Develop a regional concept of operations that sets

performance expectations for regional operators (priorities, projects, improvements, processes, performance, resources. 2) Get buy-in for the regional operations implementation agenda from public safety providers and agencies that operate elements of the transportation system. 3) Make the regional operations implementation agenda a necessary input into the transportation improvement plan/ long-range plan (TIP/ LRP). Among the performance benefits of a regional concept of operations are that "it addresses the 24-hours-a-day, seven-days-a-week operating needs of transportation systems, taking into account …sporting and other special events…periods of adverse weather, natural disasters, public safety, incidents and emergencies…"

Transportation agencies and metropolitan planning organizations should be "Considering Security and Emergency Management in the Planning of Transportation Projects". This is a key desired outcome of this project, and a challenge for collaboration. . FHWA published a document with this title in May 2012. The subtitle is "A Guide for Planners of New Transportation Projects". The reference number is FHWA-HEP-12-040, May 2012.

This succinct guide (15 pages plus brief appendices) provides an excellent beginning reference for the topic. It addresses the following questions:

1) Why should project planners consider security and emergency management measures in the project planning process?

2) Who are potential partners in the project planning process?

3) What are some examples of security and emergency management measures project planners can consider? And

4) When should project planners incorporate security and emergency management considerations during planning?

The appendices include references, a checklist for project planners, and an example table for listing partner points of contact.

One challenge for collaboration for many states and MPOs occurs in working with Native American tribal communities. This can include challenges of emergency response as well as transportation, when roads and highways, as well as natural or intentional disasters, traverse the boundaries of these sovereign nations. NCHRP Report 690, A Guidebook for Successful Communication, Cooperation, and Coordination Strategies Between Transportation Agencies and Tribal Communities (ATR Institute et al, 2011) provides information, tools, and step-by-step guidance that can assist emergency managers as well as transportation managers and operators in effectively working with tribal communities to solve problems. It includes self-assessment checklists for both tribal organizations and the agencies wanting to work with them and a step-by-step "Tribe/Agency Collaboration Toolbox". It identifies the major issues impacting tribal transportation initiatives as 1) cultural competency (lack of cultural knowledge within the transportation sector, the need for skill development in communicating cultural significance to transportation agencies, and the need for understanding of project cultural context); 2) protection and preservation of tribal-sensitive resources; 3) confidentiality of tribal-sensitive matters; 4) sovereignty; 5) land ownership; and 6) monetary matters.

Collaboration requires time, effort, patience, and leadership. However, the challenge of developing and maintaining regional transportation planning and coordination for disasters, emergencies and planned special events or events of national significance cannot be achieved without the investment in collaboration.

APPENDIX B
Survey Questions and Report of Key Findings

Traffic Management Practices

Please identify any of the following tools or practices used within the area that your agency or organization serves.

Respondents who selected transportation operations and maintenance as their disciplines or functions were asked to identify traffic management tools and practices used in the areas their agency or organization served both generally and for disasters and emergencies. Respondents primarily represented state government agencies (30 percent), transportation agencies or providers (22 percent), and regional or metropolitan planning organizations (16 percent).

Personal observation was the most common traffic management practice used in respondents' respective areas, generating 62 percent of responses. Other traffic management systems used in respondents' areas included video surveillance systems (57 percent) and vehicle detection systems (41 percent).

The findings for this question did not reveal any prevalent geographic patterns in terms of regions where these practices were being implemented.

Which of the following traffic management systems are used in your area for emergencies and disasters?

Seventy-one percent of respondents were in areas where variable message signs and temporary signage to direct traffic flow were used as traffic management systems for emergencies and disasters. Another common traffic management system was alternate routing plans for traffic, which was used by 68 percent of respondents' areas.

In regions where traffic management systems were used for emergencies and disasters, 24 percent of those regions had a regional emergency transportation coordination plan.

Planning Information

Which of the following (types of plans) are you familiar with or involved in developing?

Survey respondents were most familiar with or involved in developing regional long range transportation plans, which generated 44 percent of responses. The following types of plans received slightly below or slightly above 30 percent of responses: Transportation Improvement Program (33 percent); State Transportation Improvement Program (30 percent); local multi-hazard mitigation plan (30 percent); state long-range transportation plan (29 percent); and Unified Planning Work Program (28 percent).

From the plans listed below, please indicate how emergency transportation management is included as a priority.

The "does not apply/don't know/decline to answer" option was the answer most commonly selected by respondents. Findings generally indicated that emergency management was not a high priority in EM and transportation plans at the local, regional, and state levels. Regional long range plans had the least prioritization and funding for emergency management inclusion. There were no noticeable geographic patterns in those regions where EM was or was not a priority or typically funded.

The local or regional multi-hazard mitigation plan was selected by 10 percent of respondents as the type of plan in which EM was a high priority and usually funded; 10 percent of respondents also said EM was a priority and sometimes funded for the local or regional multi-hazard mitigation plan.

Regional long-range plans had the least consideration of and funding for including emergency management in the plans.

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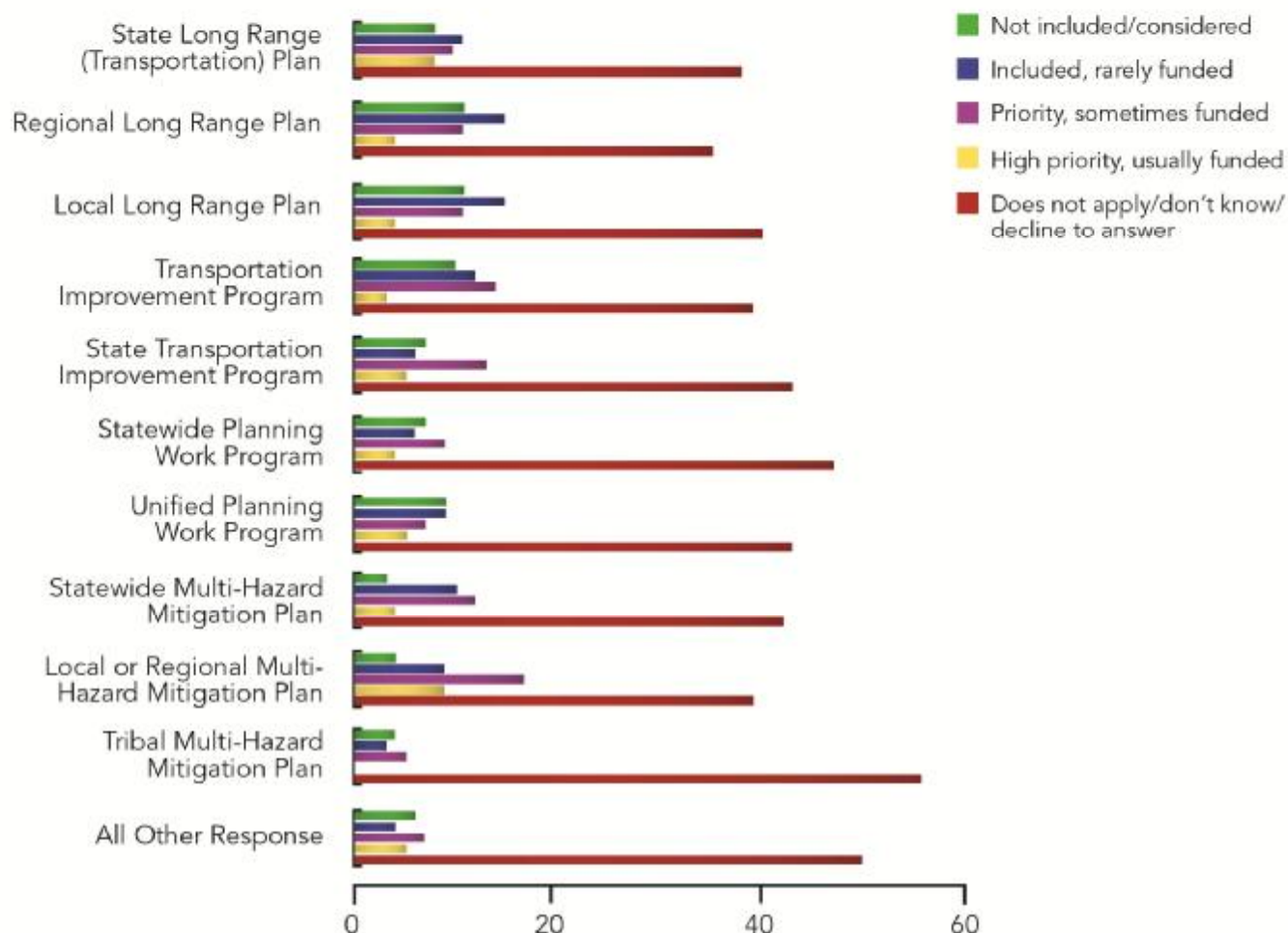## From the plans listed below, please indicate how emergency transportation management is included as a priority.

Figure 6

Regional Hazards

From the list of hazards below, please indicate which hazards are most prevalent in your region and which have occurred within the last five years. Of these events, did any require a multijurisdictional response?

Nearly all regions had a significant range of hazards that were prevalent, had occurred within the last five years, and required a multijurisdictional response. All of the hazards listed received a response rate of 80 percent or higher as being prevalent in respondents' regions.

Events that most commonly occurred within the last five years included floods, hurricanes, severe snow/ice storms, tornadoes, major power outages, and major planned events.

More than half of respondents' regions had floods within the last five years that required a multijurisdictional response. Nearly 45 percent of the regions had severe snow/ice storms occur within the

last five years that required a multijurisdictional response. Refer to Figure 7 for additional information about the prevalence of hazards in regions represented by survey respondents and those that required a multijurisdictional response.

Forty-seven percent of regions with events in the last five years that required a multijurisdictional response had a regional emergency transportation coordination plan.

Which of the following are located within your region or multi-jurisdictional area?

Most regions had infrastructure and geographic characteristics vulnerable to emergencies and disasters. The majority of regions (84 percent) had active freight railroad lines. In addition, 76 percent of respondents were in regions where bridges were vulnerable to high winds, floods, and other hazards. Seventy-three percent of respondents were in regions where dams and levees were in place. Large-scale industrial plants or similar facilities were located in 72 percent of respondents' regions.

Transportation Options

From the list below, please select the type(s) of plans your region has to address transportation planning for emergencies, disasters, and significant events.

More than half of the regions had a regional and/or state plan/annex to address transportation planning for emergencies. For example, 57 percent of the regions had a regional plan or annex to address transportation planning for emergencies, disasters, or significant events.

In addition, 54 percent of the regions had a state plan or annex to address this function. Nearly half of the regions had a local plan or annex to address transportation planning for emergencies, disasters, or significant events.

See Figure 8 for representative percentages of the types of plans that addressed transportation planning in respondents' respective regions.

Please identify which of the following modes or assets are available in the region or multijurisdictional area where you work. Of those available in your area, which are included in regional plans for disasters, emergencies, and/or significant events?

The survey results indicated a lack of regional planning for using available transportation modes in emergencies and other events. Multiple transportation modes were available in the large majority survey respondents' regions, the most prevalent of which included school buses (90 percent); ambulances (89 percent); transit buses (89 percent); aircraft (88 percent); and freight rail (87 percent). Amtrak or other trains, major freight airports, vehicles accessible by wheelchairs, vans, and charter/coach buses were also transportation modes and assets commonly selected by respondents as available in their regions.

Despite being available, the percentages of these modes included in regional emergency plans dropped significantly. For example, although 90 percent regions had ambulances available, ambulances were included in 45 percent of regional plans. While 89 percent of regions had school buses available, school buses were included in 45 percent of emergency plans.

In addition, 85 percent regions had vehicles accessible by wheelchair available; however, only 25 percent of regional emergency plans included these vehicles. See Figure 9 for more information about the types of modes included in regional plans for disasters, emergencies, and significant events.

Please identify which of the following transportation modes or assets are available in the region or multi-jurisdictional area where you work. Of those available in your area, which are included in regional plans for disasters, emergencies, and/or significant planned events?

Answer Options	Available in region/ area	Included in emergency plan(s)	
Transit buses	88	52	
School buses	88	44	
Charter/coach buses	77	20	
Vans	79	21	
Vehicles accessible by wheelchair	80	24	
Ambulances	87	44	
Subways/heavy rail	29	12	
Commuter rail	30	13	
Light rail	26	8	
Amtrak or other trains	66	20	
Freight rail	72	24	
Ferries, water taxis, or other boats	34	10	
Major passenger harbor(s)	17	6	
Major freight harbor(s)	34	12	
Aircraft	74	26	
Major passenger airport	65	22	
Major freight airport	37	10	
Major military airport	42	10	
Other (please specify)			
		answered question	**100**

Transportation Planning Organizations

Does your region or multi-jurisdictional area have a Metropolitan Planning Organization, Regional Planning Organization, Council of Governments, Tribal Planning Organization, or Rural Planning Organization that is responsible for regional transportation planning?

Although the large majority of regions had a planning organization, comparatively, a much lower percentage of these organizations were participating in transportation planning around emergencies and

planned events. Reasons for low participation rates could not be discerned from the survey results, but do present an opportunity for further research.

Ninety-five percent of respondents' regions had a planning organization of some type (e.g., metropolitan/regional planning organization, council of governments, Tribal planning organization, or rural planning organization); 54 percent of the regions' planning organizations actively participated in transportation planning around emergencies and planned events.

In addition, 43 percent of respondents had planning organizations in their regions that actively participated in tabletop exercises. Refer to Figure 10 for a complete breakdown of activities with active participation from planning organizations.

Plans, Practices, and Collaboration

Please identify which plans, policies, and/or practices are in place in your region or multijurisdictional area.

Types of plans

The survey findings demonstrated a range of regional planning practices among survey respondents. Respondents were most commonly located in regions with a regional transportation plan (72 percent). Forty-seven percent of the regions had an evacuation component or annex to an emergency plan or a regional emergency transportation coordination plan; 46 percent of the regions had a regional emergency transportation coordination plan.

Slightly more than 40 percent of regions had a continuity of operations plan and a hazard mitigation plan that included risk assessments and mitigation strategies for transportation elements.

Re-entry and recovery plans were less common regional practices, pointing to potential gaps to be addressed in the resulting Guide. For example, 32 percent of respondents' regions had a recovery plan that included transportation considerations. In addition, 20 percent of the regions had a re-entry plan for the general population.

Communication/Coordination

Respondents were also asked about regional/multijurisdictional plans, policies, and practices related to communication and coordination. Nearly 40 percent of the regions had protocols in place for working/communication with neighboring states. Only 11 percent of the regions had protocols for working/communicating with neighboring tribal lands and/or countries.

Respondents answered questions about regional communication practices to disseminate preparedness information. While using traditional communication channels was the most common practice among respondents' regions, use of social media was also a fairly common practice for conducting outreach to the general public.

More than half of respondents' regions had plans to disseminate preparedness information through traditional channels, such as print and broadcast media. Nearly 40 percent of the regions planned to use social media for outreach before, during, and after emergencies. Forty-six percent of the regions planned to disseminate preparedness information through networks of agencies and organizations.

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Please identify which plans, policies, and/or practices are in place in your region or multi-jurisdictional area. (Select all that apply)
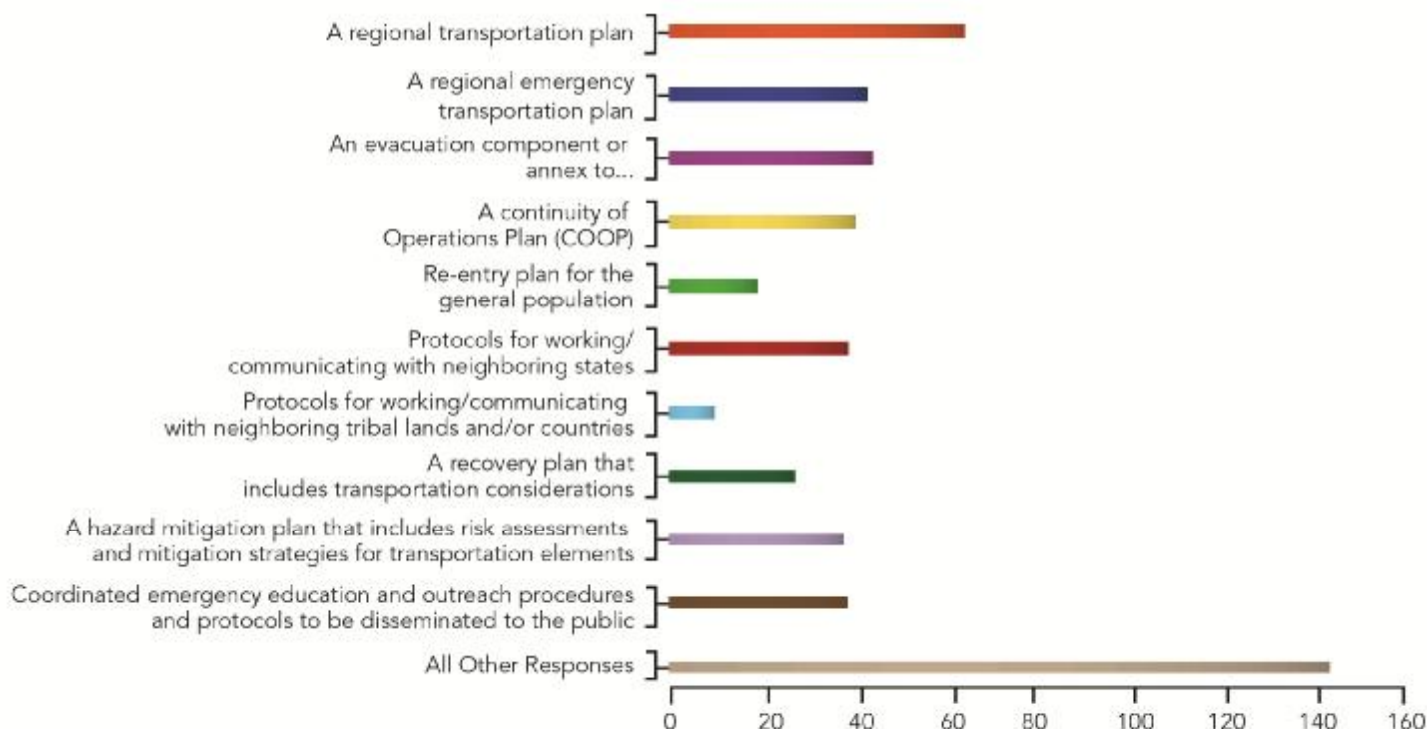
Figure 11. Plans, policies, and practices in place.

In addition, 40 percent of the regions had coordinated emergency education and outreach procedures and protocols to be disseminated to the public. For a complete breakdown of respondents' regional plans, policies, and practices in place, please refer to Figure 11.

Please identify any of the following practices your region or multijurisdictional area is prepared to use in an emergency, disaster, or significant event.

Respondents were asked to identify regional and multijurisdictional practices related to planning for transportation disadvantaged populations and people with access and functional needs, sheltering, and communication. Figure 11 illustrates responses related to regional practices.

Practices to Assist People with Access and Functional Needs

Respondents were asked about different practices their regions had in place to plan for and assist people with access and functional needs and transportation disadvantaged populations. Planning for these segments of the population, particularly in regard to planning for recovery and re-entry was not a prevalent practice.

For example, 36 percent of respondents' regions had transportation options for transportation disadvantaged populations and people with access and functional needs; only 15 percent of regions had contracts/MOUs in place to assist transportation-disadvantaged populations and people with access and functional needs. In addition, 23 percent of the regions had a medical or access and functional needs registry. Respondents were asked about regional/multijurisdictional practices related to collaboration on
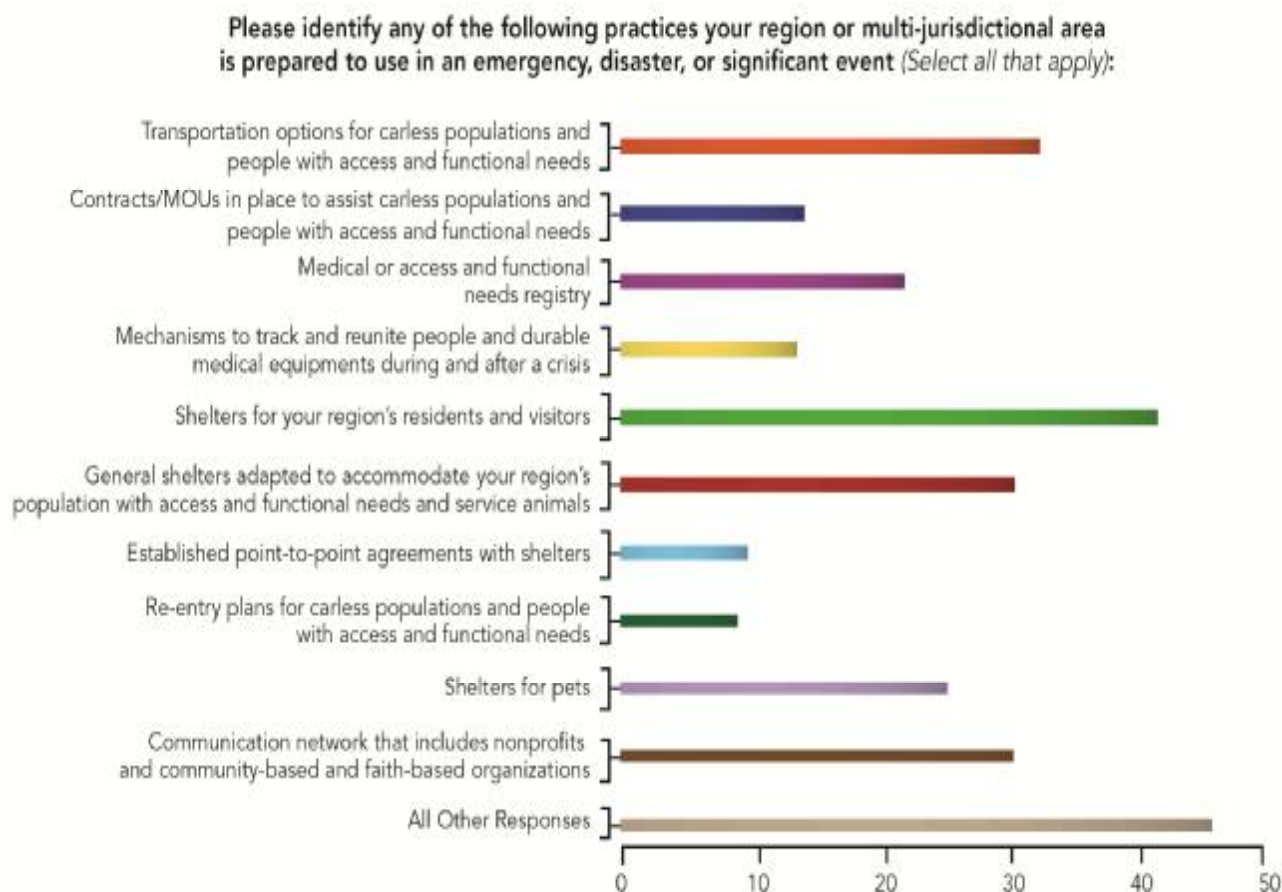
Please identify any of the following practices your region or multi-jurisdictional area is prepared to use in an emergency, disaster, or significant event *(Select all that apply)*:

Figure 12. Regional Practices

transportation planning and having agreements in place to secure transportation resources, services, and support. Please see Figure 12 below for a summary of responses.

Fourteen percent of the regions had mechanisms to track and reunite people and durable medical equipment during and after a crisis. Only 9 percent of the regions had re-entry plans for transportation disadvantaged populations and people with access and functional needs.

Respondents were asked about their level of agreement with various scenarios pertaining to the last large-scale emergency, including the evacuation of people without cars and people with access and functional needs. Of the 33 respondents whose regions had transportation options for transportation disadvantaged populations and people with access and functional needs, 14 percent strongly agreed that people without cars evacuated safely in the last large-scale emergency; 31 percent of respondents somewhat agreed that people without cars evacuated safely.

In addition, 13 percent of these respondents strongly agreed that people with access and functional needs evacuated safely in the last large-scale emergency; 32 percent of respondents somewhat agreed that people with access and functional needs evacuated safely.

Shelters

Planning for sheltering people with access and functional needs and service animals as well as pet sheltering were less common practices than planning for shelters for the general population.

Approximately 45 percent of respondents' regions had shelters for residents and visitors; 33 percent of the regions had general shelters adapted to meet the needs of people with access and functional needs and service animals. In addition, 28 percent of the regions had shelters for pets. There was minimal planning for shelters outside of respondents' regions. For example, only 10 percent of respondents' regions had established point-to-point agreements with shelters outside of their regions.

Communication

Coordinated communication planning with nongovernmental organizations was not a widespread practice. For example, 33 percent of respondents' regions had a communication network inclusive of nonprofit organizations and community-based and faith-based organizations.

Please identify any of the following practices that are taking place in your region or multijurisdictional area.

Collaboration

Collaboration on transportation planning for disasters and emergencies was more common than for planned events. For example, 70 percent of respondents' regions were collaborating on transportation

planning efforts with other jurisdictions, agencies, or levels of government related to disasters and emergencies. Forty-five percent of the regions were involved in transportation planning with other jurisdictions, agencies, or levels of government for planned events.

In addition, 45 percent of the regions were engaged in transportation planning efforts with nonprofits, governmental direct service providers, and/or community-based and faith-based organizations.
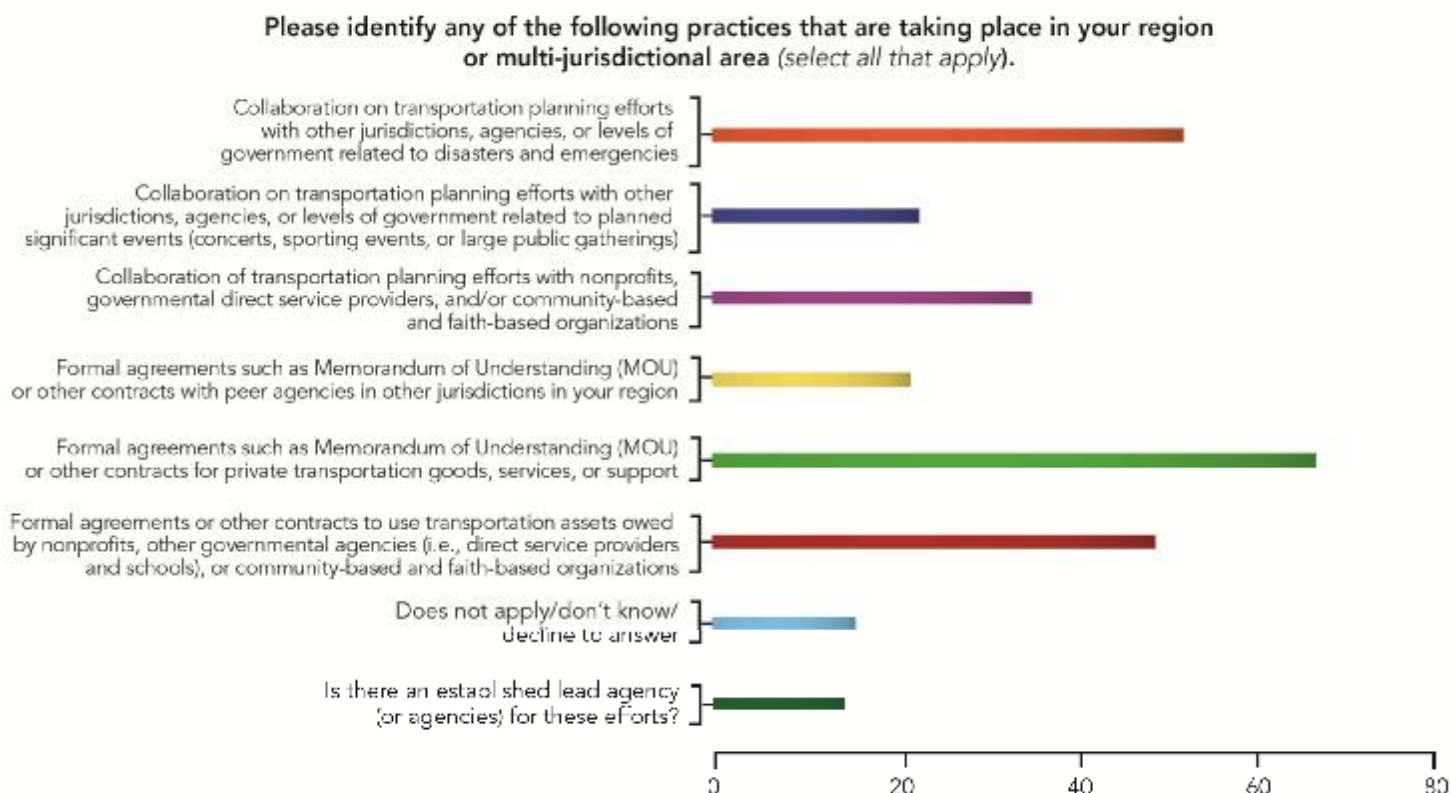
Please identify any of the following practices that are taking place in your region or multi-jurisdictional area *(select all that apply).*

Figure 13. Collaboration practices

Agreements

Overall, formal agreements and other contracts were not predominant regional practices for securing transportation resources. Respondents' regions were more likely to have agreements or contracts with peer agencies in other regional jurisdictions than with nongovernmental agencies, including those in the private sector.

For example, 33 percent of the regions had formal agreements or other contracts with peer agencies in other jurisdictions. Twenty percent of the regions had formal agreements or contracts for private transportation good, services, or support. Less than 20 percent of the regions had formal agreements or other contracts in place to use transportation assets owned by nonprofits, other governmental agencies, or community-based/faith-based organizations.

Correlation between collaborative efforts and agreements

Of the regions collaborating on transportation planning efforts with other jurisdictions, agencies, or levels of government for emergencies, 45 percent had formal agreements with peer agencies in other jurisdictions.

Of the regions collaborating on transportation planning with nonprofits, governmental direct service providers, and/or community-based and faith-based organizations, 33 percent had formal agreements or contracts in place to use transportation assets owned by nonprofits, other governmental agencies, or community-based and faith-based organizations.

Correlation between collaborative efforts and regional planning

Of the regions collaborating on transportation planning efforts with other jurisdictions, agencies, or levels of government for emergencies, 58 percent had a regional emergency transportation coordination plan.

Agency's/Organization's Level of Activity

In which of the following activities does your agency or organization participate to plan and prepare for transportation for emergencies and disasters?

Emergency planning meetings and tabletop exercises were the most common activities in which respondents' agencies or organizations participated. For example, 66 percent of the agencies/organizations participated in emergency planning meetings. Fifty-six percent of the agencies/organizations participated in tabletop exercises.

Seventy percent of respondents' agencies that participated in emergency planning meetings were located in regions with an event within the last five years that required a multijurisdictional response.

Survey respondents also represented agencies with experiences participating in actual emergency events (42 percent) and large planned events (32 percent), none of which were respondents from metropolitan or regional planning organizations.

See Figure 14 for more information about level of activity among survey respondents' respective agencies and organizations.

How often do you meet with other jurisdictions to collaborate (in person or by conference call)?

Respondents most commonly collaborated on a monthly basis with other jurisdictions (27 percent). In addition, 17 percent met with other jurisdictions or agencies to collaborate on a quarterly basis. Few respondents (9 percent) were meeting on a weekly basis.

In addition, 24 percent of respondents indicated their level of collaboration varied depending on the agency and jurisdiction.

What barriers or obstacles to coordination and planning has your agency encountered?

Respondents were asked to fill in answers related to the barriers and obstacles to coordination and planning their agencies have encountered. Funding issues, limited time and staffing, communication barriers, and traditional stovepipes in and between organizations were among the barriers mentioned.

Other responses included:

- Continued active participation

- Too many meetings; support from local government executive level is spotty; different jurisdictions have different agendas; difficult to come to consensus

- Limited capacity at the county/local level in terms of staffing and transportation expertise in emergency management planning activities

- Jurisdiction/authority challenges based on what agency (local or federal) has the authority over certain buildings, railroad, and streets

- Much higher staffing at the State Administrative Agency versus the individual state agencies

- Lack of adequate budget; too much politics; too much parochialism

- As an MPO, still assessing and working with directly involved agencies on how we can be helpful; we have limited time and staffing

- Financing may be available, but the red tape involved in getting the financing is too difficult to get through; and time for volunteers to complete all the requirements of various agencies

- Communication, lack of understanding about how to use social media; lack of public preparedness; lack of county government and state agencies to coordinate response, operations, and recovery

- Location

- Busy schedules

- A lead agency for evacuation coordination has not been identified; when doing evacuation planning, it's sometimes difficult to keep focus on transportation aspects and not expand scope to other aspects like shelters and mass care

Communications Coordination

Interoperability allows emergency management/response personnel and their affiliated organizations to communicate within and across agencies and jurisdictions via voice, data, or video-on-demand, in real-time, when needed, and when authorized (this includes equipment and the ability to communicate). Which of the following interoperable capabilities are present in your region?

In terms of interoperable capabilities, 51 percent of respondents' regions had interoperability between emergency management and law enforcement and between emergency management and fire/EMS. Half of the regions also had interoperable capabilities between different emergency management agencies.

Please assess your communication planning and testing in regard to communication overload or conflicting information (strongly agree, somewhat agree, somewhat disagree, strongly disagree).

The does not apply/don't know/decline to answer option generated the most responses to this question. Of the respondents who answered the question, most indicated their communication plans had been tested and issues pertaining to information overload and conflicting information were being addressed or discussed. In most cases, respondents whose communication plans had been tested did not identify significant problems.

Thirty-one percent of respondents had some level of agreement that their communication plans were robust and had been tested in real events and exercises; and that information overload and conflicting information had been directly addressed.

In addition, 25 percent of respondents had some level of agreement that their communication plans were robust and had been tested in exercises; and that information overload and conflicting information issues have been discussed, but not resolved.

Thirty-two percent of respondents had some level of agreement that their communication plans had been tested and flaws had been identified and were being addressed.

See Figure 16 for additional information about communication planning and testing.

Coordination in Significant Events

Survey respondents were asked about their regions' level of preparedness to move large amounts of people in a large-scale emergency. They were also asked about the level of agency coordination occurring in their regions and the outcomes of the last large-scale evacuation. In addition, respondents answered questions pertaining to desired guidance and financial assistance from the federal government. Figure 17 provides a summary of responses in addition to the following textual descriptions of the findings.
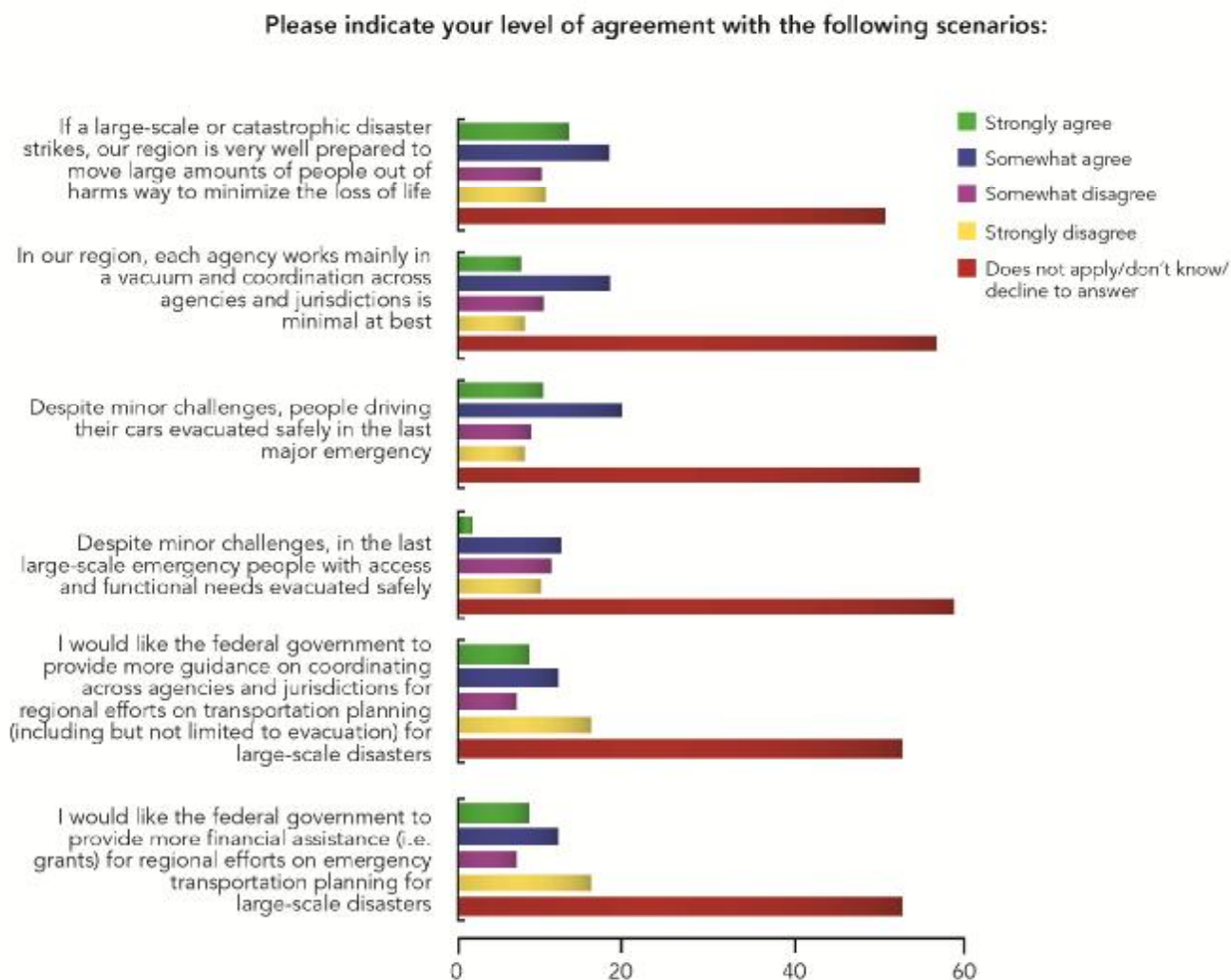
Figure 17. Scenarios

Level of Preparedness to Move Large Amounts of People

Respondents were asked about their region's level of preparedness to move large amount of people in a large-scale disaster. More than 55 percent of respondents had some level of agreement that their regions were very well prepared to move large amounts of people out of harm's way. Twenty-seven percent of respondents had some level of disagreement that their regions were well prepared to move large amounts of people out of harm's way.

Respondents' perception of the level of regional preparedness could be attributed to having regional emergency plans in place. Of the respondents who somewhat agreed their region was prepared to move large amounts of people in a large-scale disaster, 60 percent were in regions with a regional emergency transportation coordination plan and an evacuation component or annex to an emergency plan.

Agency Coordination

Respondents were asked about the level of coordination across agencies and jurisdictions. Interagency coordination was a common regional practice. For example, nearly 60 percent of respondents had some level of disagreement that agencies in their regions worked mainly in a vacuum and coordination across agencies and jurisdictions is minimal at best. In addition, 23 percent of respondents had some level of agreement that interagency coordination in their regions was minimal.

Survey findings showed consistencies in the ways respondents' depicted their regions' levels of interagency and multijurisdictional coordination and the regional planning and collaboration processes taking place. For example, of the respondents who strongly disagreed that the agencies in their regions worked in a vacuum and regional coordination was minimal, 88 percent were in regions where collaboration on transportation planning was occurring with other jurisdictions, agencies, or levels of government related to disasters and emergencies; 60 percent were located in regions where collaboration was occurring for planned events; and 56 percent were in regions where collaboration was occurring with nonprofits, governmental direct service providers and community-based and faith-based organizations.

Outcomes of Last Large-Scale Emergency Evacuation

Forty-four percent of respondents had some level of agreement that people driving their cars evacuated safely in the last large-scale emergency. Approximately 30 percent of respondents had some level of agreement that in the last large-scale emergency people without cars and people with access and functional needs evacuated safely.

Despite rating regional preparedness high, the percentages of respondents that gave a high rating to regional evacuation practices in the last large-scale emergency decreased. Of the respondents who strongly agreed their regions were well prepared to move large amounts of people in a large-scale emergency, 43 percent strongly agreed that in the last large-scale emergency people without cars evacuated safely; 33 percent strongly agreed that people with access and functional needs evacuated safely in the last large-scale emergency.

Federal Government Guidance

More than half of survey respondents would like more guidance from the federal government on coordinating across agencies and jurisdictions for regional efforts on transportation planning. In addition, nearly 80 percent of survey respondents would like the federal government to provide more financial assistance for regional efforts on emergency transportation planning for large-scale disasters.

Interview Information

A primary objective of the survey was to identify candidates for subsequent interviews conducted as part of the research process. Survey respondents were asked if they could be contacted for a follow-up interview. A total of 48 respondents provided contact information for a follow-up interview, approximately 12 of which were contacted for interviews. Additional interviewees were identified through the pilot survey and through recommendations from other interviewees and existing contacts among project team members.

Additional Feedback

Survey respondents were invited to provide additional feedback or comments related to their experiences with regional transportation planning for disasters, emergencies, and significant events. Comments varied from things respondents were doing to recommendations about the project.

Responses included:

- Very slow to accept pedestrian evacuation as a legitimate form of mass evacuation (even though there are conditions where it is clearly faster than driving or transit – if not in gridlock or shutdown)

- I believe this to be a comprehensive survey; however, some questions are very emergency management specific and need to be answered by individuals who are on that side of emergency planning in order to get the most accurate information

- Coordinate this effort with HUD Sustainable Regions

- I'm working to cut down on government costs via private sector sponsorships and other private sector initiatives

- We don't give high enough priority to regional transportation planning for emergency situations making us vulnerable for when these situations may occur. Competing priorities for limited funding have kept this on the "back burner" or an issue for another day. Only during and after emergency events do we realize the importance of this type of planning.

- Haven't seen any in my life yet.

- Need more attention to remote, isolated places.

- The creation of the ITS Architecture for our MPO helped out tremendously as far as setting up communication efforts between the local and state agencies.

- The Center has worked on a number of Ethics documents to facilitate community education and buy-in. This is an essential step to ensuring success.

- We have not developed any regional plans. We have regional support documents, however, all plans are either local or state.

Respondents also provided links to relevant websites and other information. Responses included:

- A link to a regional transportation security planning report published by the Delaware Valley Regional Planning Commission

- A link to the website for the town of Wilmington, Mass.

- www.preparemetrokc.org

- Mid-America Regional Council's website link (MPO serving a bi-state metropolitan region in Kansas and Missouri), www.marc.org

- www.pdc.org

- Hawaii Coastal Zone Management program link, http://hawaii.gov/dbedt/czm/initiative/hazard.php

Interview Guide and Synthesis of Interview Findings

Interview Guide

Objective: Based on the survey findings, we will conduct telephone interviews with key stakeholders who can provide additional information integral to our study based on their experience in various geographies; with different types of disasters/emergencies/events; and in multi-jurisdictional planning. Remember: This project is about identifying best practices in multijurisdictional transportation planning around disaster, emergencies, and significant events. Best practices include those that are: • Successful over time • Scalable • Replicable • Measurable or have quantitative outcomes • Instrumental in improving multijurisdictional performance • Innovative	
Instructions for interviewers The interviews will ask about difficulties encountered in multijurisdictional planning, coordination, and operations; how these difficulties were overcome, if they were; and challenges that still remain. This includes how long-range and short-range transportation planning meshes with emergency planning cycles- what works, what doesn't, and how transportation planning efforts, such as demand models, are being used in emergency planning scenarios and planning and response efforts. • To the extent possible, the follow-up interviews will last about 20-60 minutes.	

• Please have a copy of the respondent's completed online survey with you before the interview. In addition to the overarching questions, you will tailor other questions specifically to the respondent's answers in the online survey. • Please inform the respondent that you have access to his online survey, but that when the results are compiled and reported, all personally identifiable information will be suppressed. Ask if he/she wants his/her name and title included in the interview summaries, or if he/she prefers anonymity. • Use answers from the survey to build rapport with the respondent. • Look specifically at questions in the survey than can serve as a jumping-off point for follow-up questions. The guide suggests prompts for these in the column at right, but you can use your own.	
Interview Questions	**Prompts**
• In your response to the question on various types of plans that you are familiar with or involved in developing, you said you were familiar with or involved with developing various plans. *(See prompt)* How does each of these address emergency multijurisdictional transportation issues? Do any address multijurisdictional planning for large special events?	• Name the plans identified in the survey. • If not, why? • What were the challenges?
2. In your response on how emergency transportation management is included as a priority in plans, you said emergency transportation management is a priority or a high priority in certain plans. *(See prompt)* Please discuss how this emergency transportation planning became a priority and why.	• Name the plans identified in the survey. • What were the challenges?
2a. For DOTs, transit agencies, MPOs: Have you faced any particular challenges or successes in planning for/ coordinating transportation for emergency response with other divisions/ departments within your own agency (e.g., planning, capital planning, operations)?	

2b. For DOTs, transit agencies, other transportation providers: Please describe any standard operating procedures your agency follows to address your transportation role in the National Response Framework.	• Can you send us a copy of those SOPs?
2c. For DOTs, traffic managers: Do you have one or more regional, multi-jurisdictional Traffic Management Centers? If so, is information from the TMC available to the Emergency Operations Centers (EOCs) in the region or state? Do you have a Fusion Center in your area? If so, how is it connected with the TMCs and EOCs? Are you able to identify, track, and respond to incidents and bottlenecks on a real time basis? Can you remotely initiate traffic signal retiming? Can you remotely change messages on portable as well as fixed variable message signs?	• Other strategies and best practices? • Differences between practices/ bottleneck locations for everyday vs. emergency situations?
2d. For DOTs, MPOs and transit agencies: Are your transportation modelers (for air quality, traffic congestion, etc.) tuned in to emergency planning for transportation? Have they (you) been involved in table top exercises or other planning to identify and test scenarios	- e.g., what would happen if X infrastructure were disabled; how would congestion vary in a staged versus an "all-out" emergency evacuation; what roadways would likely be used/ reserved for bringing in emergency equipment and responders; what roadways would likely be reserved for pedestrian "walk outs"; are adjoining jurisdictions agreed as to what roadways will be used for what, and how changes will be communicated?
3. You indicated that certain hazards were prevalent in your area, had occurred in the last five years, and required a multi-jurisdictional response. Please describe the event and elaborate how the multi-jurisdictional approach was planned and implemented. Describe the synergy or positive working relationships that have resulted from this experience. Also, describe any	• What went right? • What could have gone better? • What changes have you made as a result (changes to agency plans,

opportunities you've identified for agencies to support each other through shared planning and/or leveraged planning products.	communications, and operational strategies)?
4. How have large-scale disasters or events in other parts of the nation impacted your planning efforts related to emergency transportation issues?	• Hurricanes Katrina, Rita, Isabel • Wildfires • Tornadoes, • Earthquakes • Severe storms, e.g., June 29, 2012 straight-line wind storms in N.E. U.S.
5. In your response, you indicated that (name the modes) were included in your multi-jurisdictional plans. Describe how these modes will be used in responding to disasters, emergencies, and events. How were these modes used in recovery?	• Name the modes identified in the survey.
6. How does your multi-jurisdictional area plan to move large numbers of carless people out of harm's way to minimize loss of life?	• Access and functional needs populations • Visitors • Commuters • Hospital patients • Nursing home residents
7. How does your agency/organization incorporate social media in planning for emergency communication?	• Facebook • Twitter • Email • LinkedIn
8. What activity in your multi-jurisdictional area would you consider a promising or best practice? Why?	• Performance standards? • Has practice been tested in an actual event or exercise?
9. Have you faced any particular challenges or successes in coordinating transportation for emergency response with [military facilities] [tribal nations] [correctional facilities]	• Please describe. • What has worked well? • How have you

[adjoining states] [international borders]? (Note all that apply- should be able to pick out tribal nations- from various questions, state and international from geography). Please elaborate. Have you had similar cross-border coordination experience with large planned special events? If so, please describe.	overcome challenges?
10. How do your multi-jurisdictional plans address power outages and communication failures that would impact emergency transportation plans?	• Traffic signals? • Generators? • Experience with sustained power outage.
11. In an emergency situation, have you experienced communication overload- such as contradictory information coming in from many sources? If so, how have you dealt with it?	• Types of information- media, social media, rumors, official, unofficial • Types of communication devices
Questions for MPOs, COGs, RPOs, and other regional planning organizations	
12. What do you believe are the unique challenges for regional/multijurisdictional planning organizations in being an active participant in emergency multijurisdictional transportation planning?	
13. What do you believe are the benefits of having a regional or multijurisdictional planning organization actively participate in emergency transportation planning?	
14. What do other agencies need to know or understand about your organization if they want to engage you in emergency regional transportation planning?	
Closing	

Do you have any other comments?	
Thank you for your taking time to participate in this interview. Your comments will help us develop a useful, actionable guide for multijurisdictional transportation planning around disasters, emergencies, and significant events.	

Synthesis of Interview Findings

The following is a synthesis of findings from the interviews, categorized by the various focus areas and expertise (transportation, transit, emergency management, private sector, utilities). Each category incorporates best, good or model practices; lessons learned; challenges encountered in regional or multijurisdictional planning; and a glossary of terms particular to that segment.

Transportation Managers, planners, and operators

State level

The role of state departments of transportation (DOT) is commonly one of management and coordination in which they oversee the overall statewide program, facilitate, then plan and respond by providing knowledge, equipment, resources, personnel, etc., across various regions and districts within states. Commonly, state DOT headquarters staff coordinate with their counterpart state-level agencies, including the state police and offices of emergency management as well as federal agencies, such as the U.S, Department of Transportation (USDOT), various branches of the military, and, in some cases, international counterparts.

These state structures appeared to be consistent with the National Incident Management System (NIMS) framework in which local agencies tend to have the first line of responsibility for emergency and disaster planning and management and, when they do not have the required resources and capabilities, they turn to the state and the state to the federal level. An example of this can also be seen in evacuation planning where the state headquarters support the regions through regional and cross-state evacuation routing and guidance, but the first-line evacuation decision making and emergency preparedness is led by local government officials.

DOTs maintain accessibility to the transportation infrastructure and interconnectivity during emergencies, including situations which require additional resources beyond those of a local community. In these instances, the state-level agencies can provide assistance by reallocating resources from one district to another where and when they were needed.

From an operational standpoint, DOTs can also be particularly effective at providing support by supplying heavy equipment and personnel; maintaining and operating (closing) bridges, intersections, traffic signals; supporting the repair and reconstruction of other infrastructure such as sewer lines; and conducting damage assessments.

Interviewees also pointed out that the use of various useful communications tools permits the sharing and communication of data and information across the state. Tools such as WebEOC and the DOTs' in-house fleet management software were cited as useful and effective tools that permit DOT personnel to better accomplish their missions during critical times of need. In the past, standard email systems were used to request and disseminate information; however, this was not always reliable and distributions did not always reach their full-intended recipients.

One weakness cited by a Gulf Coast state transportation official was the lack of a multi-state emergency action plan with nearby states. State government agencies are unable to reach out beyond their boundaries in emergency situations. This is especially important because in planning for reentry. State officials can work together, but this coordination has not permeated down to the regional or local levels.

State DOTs pointed to their ability to assess situations quickly and conduct damage assessments that lead to road closures or openings and, most importantly, sharing this information to its users as being particularly useful.

Good and promising practices in transportation

Adams County, Colo., is currently incorporating hazard identification, their land use plan, and their transportation plan into one document. The county is attempting to develop policies and goals that help bring these three areas together. For example, a policy might be to prohibit development and road construction in an area known to have a high flood risk. As another example, they might have land use restrictions for locating non-natural hazards. The document generated by this new effort will be used by public works.

In New Hampshire, the state DOT has a Transportation Management Center (TMC) in the Incident Planning and Operations Center, which is co-located with state police, 911, and the fire marshals all in the same building. This effort aligns with the National Response Framework (NRF) and Emergency Support Functions (ESFs). In 2008, an ice storm caused scores of power outages and many closed roads. A New Hampshire DOT representative coordinated ESF #1 and ESF #3 mainly to clear roads and highways.

After Action Reviews are conducted following large disasters. These reviews provide different viewpoints about how operations went and how they can be improved. These reviews originate in the TMC and then are sent to other agencies in the DOT as well as other relevant state and local agencies involved in the incident.

New Hampshire plans to get a better Advanced Traffic Management System (ATMS) to better train in real time. Their operators currently use multiple systems to get one job done. They are working to get all of the data into one data fusion center. If there is a major event on a highway, they will be able get that data to message boards further up the highway to reroute traffic ahead of time. They want to get speed, occupancy, and volume data to be able to get data to drivers. They have a system now that makes them capable of delivering data to post to a 511 webpage so the public can view and see where incidents are occurring (511nh.com). They have ITS devices on the roadways that operators can send messages to through ATMS to post messages. The idea for an ATMS system is to have all of the data in one place so the operators don't have to use multiple systems.

At the TMC, scenarios are for operator training, but not computer simulated or virtual training. Tabletop exercises are conducted a couple times a year, mainly used for radiological events. They are currently working on project called New Hampshire Visual Incident Emergency Watch Web (NHVIEWW). The TMC is working with DOT planning department and department of safety to merge dataset to merge road closure data into EOC rather than using spreadsheet driven systems. This will allow real time mapping. The table top will be used to train how to use this new system, but in the future this could help to change how tabletop exercise are run. Users of the system will be able to be at their own computer, which is where they are likely to be during an emergency rather than being a room where they are with people they have never met before. This system is still under development. The TMC is still working on the computer integration aspects of this new NHVIEWW system.

At the TMC, operators are trained to detect, verify, and respond. If a citizen calls and says there is a box on the roadway, they need to verify if there is something before they respond. They determine if DOT

needs to respond or if another agency needs to respond. This process is very coordinated across multiple agencies.

The Alaska DOT developed a Field Operation Guide specifically for the transportation divisions that includes information about responding to various types of incidents, such as earthquakes and floods. For example, a 5.2 earthquake triggers Operations and Maintenance officials to assess infrastructure to see how it has been affected. The Field Operation Guide addresses how to assess post-disaster impact. It is a multi-faceted document and includes a small, removable pocket guide with checklists about what to do in different emergencies/disasters. In the back of the guide is a CD-ROM that has Incident Command System (ICS) forms and an electronic version of the guide and other resources. The CD-ROM also has various emergency plans of agencies willing to share them as well as references to other plans. The DOT also manages an internal website that has 10 training modules that accompanies the guide.

The Field Ops Guide addresses the NRF under continuity of government planning and deals with resilience in how to keep transportation going and infrastructure working.

A western state DOT has managed to incorporate security and emergency mitigation into recent "mega-projects." These include seismic retrofits for bridges and tunnels that also improve standoff distances for possible explosions. Other measures include security cameras and intrusion detection devices for hatches and other entrances. This has been achieved through dogged persistence on the part of DOT personnel with security and emergency planning expertise,; "poking the engineers in the eye" and "poking elected officials in the eye" until they pay attention is how it was phrased. This has taken place following the design and construction of a major new bridge without such features; retrofitting is much more expensive and has never made it into the budget.

At an eastern jurisdiction, emergency personnel in the Department of Transportation have had less success than the western state in impressing project planners with the need for considering emergency planning considerations and security. For example, bike lanes were installed along a designated emergency evacuation route, without consultation with the jurisdiction's DOT emergency transportation personnel or consideration of the implications, and streetcar lines are being developed along other designated emergency evacuation routes.

Sharing Borders: Interstate, International, Tribal, and Military

Several geographical areas represented in this report share interstate or international boundaries, and include Tribal nations or military bases. TMCs play large roles in multijurisdictional transportation planning for large cities that spread across more than one state. TMCs naturally bring together the different disciplines that should be involved in multijurisdictional transportation planning for emergencies and planned events. In the **Kansas City** Metropolitan Area, the KC Scout (TMC) works with dozens of cities and nine counties located on both sides of the Missouri and Kansas state line. Similar bi-state operations also exist at the Gateway Guide (TMC) in the **St. Louis** area straddling Missouri and Illinois and another TMC in the **Cincinnati** area, covering Ohio and Kentucky.

In Michigan, numerous emergency response and enforcement agencies work with the Michigan DOT TMCs. In several cases, the TMCs are housed jointly with EOC's. In such cases, MDOT and state police personnel jointly staff the facilities. Because the state has dedicated and unified communications capability, all video and data are also streamed into the state communication network so the DOT and State Police headquarters officials in Lansing can access any of the local feeds.

Borders shared with other nations, Tribes, and military installations greatly expand the definition of multijurisdictional transportation planning to include additional levels of government and private sector providers as well as sensitivity to different cultures and rules of law.

For example, when working with native cultures, one interviewee said it was important to find a champion that believed the emergency was a high enough priority to respond –usually city manager, post office person (often the same person). Communication is another issue: In Alaska, the DOT used to use AM radio to communicate with native cultures. Now it uses HAM radio operations and works with an interpreter.

When dealing with the military, the challenge is establishing the initial communication and finding out who is in charge and who has the authority to make those decisions. Once this has been established, cooperation becomes easier because the military has such a defined command structure.

The border issues for the New York State Department of Transportation (NYSDOT) are somewhat similar to those of Michigan. In both states, there are numerous international crossing points between Canada and the United States. In some New York locations, TMCs are staffed jointly with transportation agency counterparts from Canada. The primary border issues at these locations are associated with commercial freight operations and not as much in emergency and security issues. The regional NYSDOT district personnel are primarily responsibility for these activities.

Good or promising practices regarding shared boundaries
The Michigan Department of Transportation (MDOT) is responsible for numerous international crossing points between Canada and the United States. In addition to tourist and commuter traffic, many of these locations also serve as vital links for commercial shipping traffic particularly associated with the automotive industry that closely links both countries. Based on this, MDOT maintains close relationships with transportation officials in Ontario, Canada, mostly related to the bridges and tunnels in the state. However, these relationships also spread to states that share borders with Michigan, Ohio, Indiana, and Wisconsin. Interviewees pointed out examples of when major snowstorms that affected areas of Ontario led to the closure of freeways in Canada. Based on this, MDOT officials changed information on variable message signs throughout the state and, in particular, near interstate crossings into Michigan from border states of Ohio, Indiana, and Wisconsin to inform automobile and commercial traffic of these border link closures and to suggest alternative routing.

Washington State shares a long border with the province of Vancouver in Canada. They share information on border crossing times. They worked together closely in planning and carrying out the winter Olympics. They coordinate regularly on border crossings for emergency medical services and other issues, such as developing cross-border detours in remote areas in cases of flooding or similar disruptions. They also cooperate closely in fighting fires.

In Memphis, Tenn., hazards that impact the region tend to be large in scale, and this necessitates the Memphis area MPO to be able to interact across political boundaries and jurisdictions. A recent example was a flooding disaster that crossed into many different jurisdictions. Because of long-term planning and coordination interactions with all of these communities and the bordering state of Arkansas, the interviewee described the role of the MPO as something like "the glue that holds the separate cities together."

In Maricopa County, Ariz., which contains a U. S. Air Force base and several tribal nations, the Department of Emergency Management has a planner assigned to work with each of these entities. The air force and tribal nations are invited to participate in planning and exercises.

In Alexandria, Va., collaboration and cooperation is paramount. The city is involved with numerous military facilities' EM planning efforts such as their building evacuation plans and occupant training. The city is a part of the military's messaging system, tests, and processes.

Washington, DC has major ongoing coordination with the Military District of Washington, especially for security events, like the 2009 Inauguration or the World Bank G-20 and similar meetings, with heads

of state from around the world. Airports are located in Virginia and Maryland, so cross-border security coordination is essential. The new DCHSEMA Emergency Plan, to be released this year, will include two new ESFs- ESF 17- Private Sector and ESF 18- Military Affairs. The military sometimes supports ESF 13, Law Enforcement, as in perimeter and crowd control, and also supports ESF 1, Transportation, in traffic control.

In DC, there is regular, ongoing coordination with ESFs 4 (law enforcement), 9 (health) and 13 (fire and rescue) across state/city borders- law enforcement pursuing suspects; health -transporting patients to hospitals across borders; fire and rescue responding to incidents across borders as needed. The Metropolitan Washington Council of Governments (MWCOG) has implemented the Metropolitan Area Transportation Operations Coordination (MATOC) Program that is discussed below in the MPO section.

NJT Police is part of the NE Corridor Working Group- includes NYPD, extends down to Washington DC.

In Craig, Alaska, most involvement in the planning process has been done with Tribes and tribal corporations. Most interaction has been with the Tribes. They are a part of the Local Emergency Planning Committee (LEPC). Because there is not a reservation system, the Tribes, and corporations, have overlapping interests and shareholders have overlapping, but different interests. Tribes operate social programs – family and youth services, low-income housing, and roads because of Bureau of Indian Affairs funding. The corporations were created to create businesses that provide employment or generate revenue that benefit shareholders.

Most Tribes have an environmental planner position. The Craig Tribe has included emergency management in their work plans for their environmental planners, so they have their own planning and emergency response responsibilities within the Tribe. The Craig EM shares information and resources. There are differences in cultural priorities, and the city's approach has been to use those cultural priorities to the benefit of the overall planning process. For example, the weakest link in Craig EM response is public warning. There is no operational siren system nor a community radio or TV station. All attempts at public warning or public information are piecemeal. Most of the public warning and notice system consists of asking key agencies to make notice within their agencies. For example, the EM office can cover a sector by calling the forest service to disseminate information.

The Tribes culturally have a focus on elders. Because of their position, the elders have a focus on tribal members. The EM uses the Tribes' priorities, instead of creating a situation where there is sensitivity. Tribal representatives want to make sure their members are taken care of and watch that through the planning process. The Craig EM can then ask the Tribes to take on the responsibility of notifying elders and members. The key is to figure out how to engage the Tribe so cultural priorities are met and the EM response priorities are met.

When getting communities together, there are varying levels of native populations. EM can't focus on the cultural issues, but can't ignore them either. The more Tribes are engaged, the more it will help resolve things that are culturally important to them.

APPENDIX D
Webinar Summaries: Panel and Stakeholder Review of Draft Guide

The project Panel requested the opportunity to view the draft Guide and presentation prior to the planned stakeholder review. The webinar with the Panel was conducted July 10, 2013 from 2 to 3 pm using AdobeConnect technology. The Panel Members and Senior Program Officer provided feedback and suggestions on the presentation, the graphics, the guide layout, and the content.

Major comments from the Panel webinar included:

1. The presentation- needed to stress why each principle was relevant to multijurisdictional transportation planning for disasters, emergencies and significant events;
2. The graphics -some panel members objected to the symmetrical, defined nature of the major graphic and would prefer a more amoeba-like or interlocking puzzle- type graphic to better demonstrate the interconnectedness of the principles and variable dynamics of any major event; others would prefer a more "spoke-like" look to emphasize the hub/ spoke/ wheel nature of the graphic;
3. The Introduction – some materials from later on (such as Tool 5) would be useful to give more context to the Introduction; and
4. The layout – some panel members dislike the double column/ sidebar layout (particularly when reading a pdf on-line- skipping page to page gets confusing. The Senior Program Officer recommended review of TCRP Report 160 for a possible alternative model.

The webinar with stakeholders and one Panel member was conducted July 25 from 2 to 3 pm. Ten stakeholders were in attendance, representing MPOs, DOTs, Emergency Managers, Tribal Emergency Coordinators, and other experts. In addition, others who were not able to attend were sent a follow-up email to provide comments. One person who was unable to attend was interviewed individually. The presentation was changed significantly from the presentation viewed by the Panel; the attendees were able to view and comment on two alternatives to the main graphic (both with a "spoke" look), and comment on alternative layouts, including two pages from the Report 160 format suggested by the Senior Program Officer.

The stakeholders were very engaged in the conversation, and provided extensive comments and recommendations for the Introduction, minor comments on Principles, Case Studies and Tools, and helpful feedback on the base and alternative graphics and layout options.

Major comments from the stakeholder webinar include:

1. Provide more discussion and description on resilience, including metrics.
2. Provide linkages between transportation planning processes and emergency management planning processes- demonstrate where they can support each other (graphically and in text)- don't think this has been done before- could be extremely useful.
3. Keep at high-level- avoid "weeds" of SOPs- planning processes different
4. Clarify- this is NOT a stepwise process, but supports those processes
5. Center is strong, intro and tools need more work.

The list of invitees to the Stakeholder webinar, which includes only the organizations of the invitees and attendees, is provided as Attachment A. The PowerPoint presentations from the two webinars are included as Attachments B and C.

ATTACHMENT A: STAKEHOLDER INVITEES AND ATTENDEES

Invitees for the July 25th Webinar

No.	Organization	Attended?
1	Virginia Department of Emergency Management	
2	Arlington County OEM	
3	All-modes Transportation Professional	Interview
4	Office of Emergency Preparedness and Response, City of Norfolk	
5	Emergency Management City of Victoria, TX	
6	Emergency Management City of Alexandria, VA	
7	Emergency Preparedness - City of San Ramon	
8	Department of Emergency Management at the Eastern Band of Cherokee Indians, Cherokee, North Carolina	
9	State Hazard Mitigation Office, Virginia Department of Emergency Management	Yes
10	North West Tribal Emergency Management Council	Yes
11	Former NC EM	
12	FEMA disaster specialist	
13	USACE	
14	Mitigation expert	
15	Consultant	
16	Hazards Planning Research Center, American Planning Association Chicago, IL	Yes
17	Consultant and Retired Professor Miami, FL	
18	NCHRP Report 20-59(42) Panel Member	Yes
19	MTA, New York City	
20	AARP Louisiana, Baton Rouge, LA	
21	Policy Advisor, CDC, Atlanta, GA	
22	Evacuteer.org, New Orleans, LA	
23	Natural Hazard Mitigation Association	
24	New Orleans Regional Planning Commission	
25	Professor of Sociology, University of New Orleans	
26	New York State Department of Transportation	
27	Delaware Valley Regional Planning Commission	Yes
28	New York State Department of Transportation	
29	State of Michigan	Yes
30	MPO in Memphis, TN	
31	Johns Hopkins Applied Physics Lab	Yes
32	Transportation Infrastructure Security U.S. Department of Homeland Security FEMA Grant Programs Directorate Preparedeness Grants Division	
33	Pacific Northwest Economic Region	
34	District of Columbia Homeland Security and Emergency Management Agency	

No.	Organization	Attended?
35	Metropolitan Washington Council of Governments	
36	Kansas Department of Transportation	Yes
37	Kansas City Area Transportation Authority (KCATA)	
38	City of Craig, AK	
39	KC Scout	
40	Mid-America Regional Council	Yes
41	Iowa DOT	
42	NYMTC	

ATTACHMENT B: PANEL WEBINAR POWERPOINT PRESENTATION (PDF)

Welcome to the Webinar
July 10, 2013 – 2:00pm ET

NCHRP 20-59(42)
A Guide to Regional Transportation Planning for
Disasters, Emergencies and Significant Events

Phone Number for Audio:
Access Code:

Please **MUTE** your computer speakers during webinar
and use your **PHONE** for listening and speaking.
Thank you!

Agenda

- Self Introductions
- Brief Overview of Adobe Connect Features
- Overview of Draft Guide
- Open Discussion and Comments

Adobe Connect Chat, Notes, and Polls

- Use the Chat pod *(at screen bottom)* to type your questions, comments, and ideas for discussion
- The Notes pod *(at screen right)* displays a summary of comments and ideas being discussed
- Use the Poll pod *(when displayed)* to vote anonymously on discussion items
- Use Raise Hand *(at screen top)* when you are finished voting in the Poll and to be recognized as a speaker

NCHRP 20-59(42)
A Guide to Regional Transportation Planning for
Disasters, Emergencies and Significant Events

Draft Guide- Panel Webinar July 10, 2013

Limited Use Document

By The Louis Berger Group (Daborah Matherly, Jane Mobley, Neall Langdon,
Rea Wilson, Illika Sahu and Korey Smith) with
Brian Wolshon, LSU: John Renne: Roberta Thomas, Atkins:
Pam Murray-Tuite and Vinay Dixit

Guide Focus:
Transportation
Planning Precepts and
Principles that lead to
Multijurisdictional
Community Resilience

Guide Organization

- Executive Summary
- Introduction
- Section 1- Principles
- Section 2- Case Studies
- Section 3- Tools
- Section 4- Additional Information
- Appendices

Basic Premises

Transportation is a key asset in any major event.
Conversely, can also present a hazard.

All potential circumstances require communication & collaboration, plus application of basic principles identified in the Guide.

NCHRP 20-59(42)

Basic Findings from Research

Successful multijurisdictional transportation planning for disasters, emergencies and significant events is taking place

- around the country and across international borders
- In many different contexts and institutional settings
  - non-profit organizations
  - metropolitan planning organizations
  - transportation agencies
  - land use organizations
  - emergency planning agencies

  As part of
  - long range transportation plans
  - hazard mitigation plans
  - emergency plans
  - short range operations plans

NCHRP 20-59(42)

Precepts

- Communication and collaboration bind all the other principles together.

- Without these, no other part of a multijurisdictional planning process can be functional.

NCHRP 20-59(42)

Principle 1: Comprehensive

Look at full range of potential events, possible stresses, interdependencies

Planning develops, examines, tests a range of solutions to address resulting impacts – impacts on critical services, constituents, response capabilities, and short and long range recovery.

NCHRP 20-59(42)

Examples: Comprehensive Planning

- Washington State DOT has incorporated security and emergency mitigation into recent mega-projects (e.g., seismic retrofits for bridges and tunnels that also improve stand-off distances for explosives).
- Adams County, CO, is incorporating hazard identification, land use and transportation plan into a single document and integrated plan.

NCHRP 20-59(42)

Principle 2: Cooperative

- Process seeks values and uses input, suggestions, concerns, insights, and critiques from all stakeholders, public, private, and non-profit.
- Is not "top-down" or single government-agency driven.
- Closely linked with "collaborative."

NCHRP 20-59(42)

Examples: Cooperative Planning

- Ass'n of Bay Area Governments responsible for land use planning and hazard mitigation planning.
- Pacific Northwest Economic Region and Center for Regional Disaster Resilience (non-profit) promotes public & private sector cooperation across 5 western states & 5 Canadian provinces or territories.
- All-Hazards Consortium – similar non-profit mid-Atlantic and Northeast (9 states).

Principle 3: Informative

Data acquisition, analysis, decision-making, guidance development, and transfer of information....

In a timely, accurate, clear, simple, and useful way.....

To residents, travelers, first responders, and other stakeholders.

Guides action-oriented plans for specific communication messages, methods of presentation, and means of delivery.

Closely linked with Communication.

Informative Planning Examples

- TRANSCOM – greater NY area.
- San Francisco Area Metropolitan Transportation Commission – operates 511 call service, serves as public info clearinghouse during a disaster.
- All-Hazards Consortium helped work around tolling station bottlenecks for utility truck and response convoys after Hurricane Sandy.

Principle 4: Coordinated

Identifies problems and solutions.

Fosters complete and cohesive interaction between agencies, across hierarchical and jurisdictional boundaries- vertical and horizontal integration.

Coordinated Planning Examples

- The San Francisco area Metropolitan Transportation Commission has complementary emergency transportation plans, one coordinating transportation assets to enable emergency response, and one focused on restoration of basic transportation services to the general public.
- The Association of Bay Area Governments coordinated multi-jurisdictional local hazard mitigation plans (LHMP) including transportation

Principle 5: Inclusive

Creates an equitable transportation system that addresses the needs of all people.

All people affected by the plan can be involved or represented.

Includes people with and without automobiles, people likely to be marginalized, people with access and functional needs.

Inclusive Planning Examples

- New Orleans City Assisted Evacuation Plan classifications and collaboration for Hurricane Gustav
- Anchorage Alaska - Access Alaska and the EMA
- Craig, Alaska – full tribal integration in emergency planning
- Louisiana Nursing Home Association verification of vehicle availability by type

Principle 6: Tested/ Exercised

Small and mid-size events "tested" in daily incidents.

Large planned events test broader coordination and communication strategies.

Tabletop to full-scale exercises hone relationships and test weak spots prior to an actual disaster.

Testing Examples

- DC and Washington Metro assess evacuation strategies and regional communications during July 4 Celebration events.
- Tampa prepared for Super Bowl XLIII with a full-scale exercise concurrent with a college bowl game.
- Scenarios for PNWER Blue Cascades Exercises are primarily generated by the private sector partners.

Principle 7: Flexible

Plan for unlikely circumstances that could cause significant harm.

Plan for ripple effects and interdependencies-

- earthquake/ tsunami/ disabled nuclear power stations;
- tunnel flooding disrupts power, transportation and communications due to co-located utilities.

Flexible Planning Examples

- Co-locating personnel – e.g., EMA, COG, DOT Traffic Management Center, police, public school, and military liaisons, Fusion Center, 911 and 311 call centers (with portable command centers as well)

Principle 8: Continuous / Iterative

Ongoing.

Sustains and maintains critical relationships through regular interaction and informal and formal agreements.

Undergoes regular assessments.

Conducts improvement planning after any event.

Continuous Planning Examples

- Michigan DOT and Canada maintain numerous international crossing points, with formal and informal agreements. Michigan also coordinates with Ohio, Indiana, and Wisconsin; at least once, major snowstorms in Ontario led to announcements and reroutings in Michigan, Ohio, Indiana, and Wisconsin.
- PNWER and AHC exercises and demonstrated relevance generate their continuity.

Section 2: Case Studies

1. **Pacific Northwest Economic Region (PNWER) and the Center for Regional Disaster Resilience** - Nonprofit agency established and active since 1991; includes public and private sector partners in 5 western U.S. states, including Alaska plus 5 Canadian provinces or territories. Active exercise program, active in Olympic and other cross-border planning.
2. **Anchorage, Alaska-** The largest center for independent living, "Access Alaska," is working with other agencies to coordinate a Functional Needs Support Services Working Group, coordinating with the Emergency Management Agency.
3. **All Hazards Consortium-** Nonprofit agency to facilitate multi-state collaboration efforts, focusing on private sector as well as public sector participants. Modeled on PNWER, demonstrated successes foster continued collaboration.

Section 2: Case Studies (cont.)

4. **Southwest Missouri Council of Governments-** prepares Regional Transportation Plan and assists member counties in developing and updating hazard mitigation plans, including multi-jurisdiction HMPs.
5. **Association of Bay Area Governments-** Led and coordinated the Multijurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area, explicitly including transportation and interdependencies.
6. **Matanuska Susitna Borough, Alaska-** Example of cooperation and collaboration between tribal, emergency management, transportation, transit, and private nonprofit and for-profit agencies.
7. **Marathon Bombing Medical Care & Transportation Coordination**
8. **Northern Kentucky Health Department** (example potential partner)
9. **Superstorm Sandy/ NYMTC**

Section 3: Tools

1. Checklist of Potential Stakeholders
2. Checklist of Potential Transportation Assets (High Level)
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6. Key Steps to Effective Collaboration
7. Questions for Collaborative Partners and Other Stakeholders to Ask Each Other
8. Strategies to Test Regional Transportation Plans for Disasters, Emergencies and Significant Events

Section 4: Additional Information

- Glossary of Terms
- Useful Resources
- Legal Background
- References

Open Discussion

Principles

Comments on the basic graphic?   Principles?
Other comments?

General Questions

- First impressions?
- Are the principles on target? Any missing? Any redundant?
- Are the sections dealing with the principles on target? – e.g. strategies, examples, organization. Too long? Too short?
- Are the case studies helpful?
- Are the tools helpful?

Appreciation

The research team is grateful to panel members for their interest and their prompt and thoughtful responses and critiques.

ATTACHMENT C: STAKEHOLDER WEBINAR POWERPOINT PRESENTATION (PDF)

Principles- Chapter Organization

- Definition of principle (xx)
- What does xx planning look like?
- Who is involved?
- What needs to happen for planning to be xx? (strategies)
- Why is xx important?
- When does a xx approach need to take place within the planning process?
- Examples (throughout)
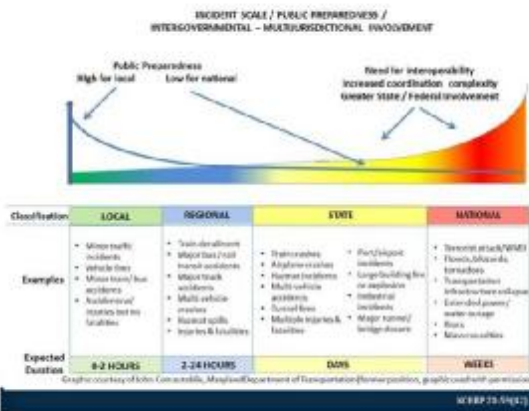
Principles- Chapter Organization

- Definition of principle (xx)
- What does xx planning look like?
- Who is involved?
- What needs to happen for planning to be xx? (strategies)
- Why is xx important?
- When does a xx approach need to take place within the planning process?
- Examples (throughout)

Basic Premises

Transportation is a key asset in any major event.

Conversely, can also present a hazard.

This Guide focuses on the regional to national scale (not local).

All potential circumstances require communication & collaboration, plus application of basic principles identified in the Guide.

Basic Findings from Research

Successful multijurisdictional transportation planning for disasters, emergencies and significant events is taking place

- around the country and across international borders
- in many different contexts and institutional settings
  - non-profit organizations
  - metropolitan planning organizations
  - transportation agencies
  - land use organizations
  - emergency planning agencies

  As part of
  - long range transportation plans
  - hazard mitigation plans
  - emergency plans
  - short range operations plans

Precepts

- Communication and collaboration bind all the other principles together.

- Without these, no other part of a multijurisdictional planning process can be functional.

Principle 1: Comprehensive

Look at full range of potential events, possible stresses, interdependencies.

Multijurisdictional relevance?
Planning develops, examines, tests a range of solutions to address resulting impacts – impacts on critical services, constituents, response capabilities, and short and long range recovery.

Principle 2: Cooperative

Process seeks values and uses input, suggestions, concerns, insights, and critiques from all stakeholders, public, private, and non-profit.

Multijurisdictional relevance?
Is not "top-down" or single government-agency driven.
Subset of "collaborative."

Principle 3: Informative

Data acquisition, analysis, decision-making, guidance development, and transfer of information....
In a timely, accurate, clear, simple, and useful way.....
To residents, travelers, first responders, and other stakeholders.
Multijurisdictional relevance?
Guides action-oriented plans for specific communication messages, methods of presentation, and means of delivery.
Subset of Communication.

Principle 4: Coordinated

Identifies problems and solutions.
Multijurisdictional relevance?
Fosters complete and cohesive interaction between agencies, across hierarchical and jurisdictional boundaries- vertical and horizontal integration.

Principle 5: Inclusive

Creates an equitable transportation system that addresses the needs of all people.
Multijurisdictional relevance?
All people affected by the plan can be involved or represented.
Includes people with and without automobiles, people likely to be marginalized, people with access and functional needs.

Principle 6: Exercised

Small and mid-size events "tested" in daily incidents.
Large planned events test broader coordination and communication strategies.
Tabletop to full-scale exercises hone relationships and test weak spots prior to an actual disaster.
Multijurisdictional relevance?
Greater complexity= greater need for practice, relationships.

Principle 7: Flexible

Plan for unlikely circumstances that could cause significant harm.

Multijurisdictional relevance?

Need to plan for ripple effects and interdependencies-

- earthquake/ tsunami/ disabled nuclear power stations;
- tunnel flooding disrupts power, transportation and communications due to co-located utilities.

Principle 8: Continuous / Iterative

Ongoing. Undergoes regular assessments.

Conducts improvement planning after any event.

Multijurisdictional relevance?

Sustains and maintains critical relationships through regular interaction and informal and formal agreements / overcomes staff/ leadership changes.

Section 2: Case Studies

1. **Pacific Northwest Economic Region (PNWER) and the Center for Regional Disaster Resilience** - Nonprofit agency established and active since 1991; includes public and private sector partners in 5 western U.S. states, including Alaska plus 5 Canadian provinces or territories. Active exercise program, active in Olympic and other cross-border planning.
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Section 2: Case Studies (cont.)

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6. Key Steps to Effective Collaboration
7. Questions for Collaborative Partners and Other Stakeholders to Ask Each Other
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Open Discussion

NCHRP 20-59(42)

Content Questions

- Are we describing the principles correctly?
- Are the sections dealing with the principles on target? – length/ description/ organization?
- Are the examples too long or too specific? Would generic examples be better?

NCHRP 20-59(42)

Content Questions (cont.)

- Are the case studies helpful? Too long? Other?
- Are the tools helpful?
- Do any sections or items seem out of place?
- Would any "back" material be more helpful up front?
- Other questions or comments?

NCHRP 20-59(42)

Layout Options

Current   Option 1- sidebar font

NCHRP 20-59(42)

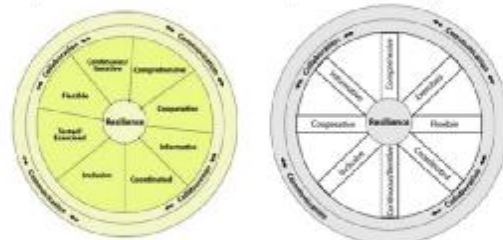## Layout Option- Icons/ no sidebars (TCRP Report 160)

NCHRP 20-59(42)

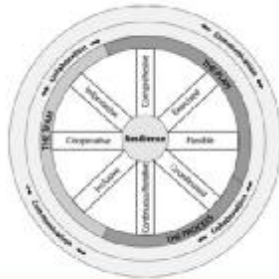## Format- Basic Graphic

Option 1- as in Guide   Option 2- emphasize spoke

NCHRP 20-59(42)

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ABBREVIATIONS, ACRONYMS, INITIALISMS, AND SYMBOLS

ABAG	Association of Bay Area Governments
AHC	All-Hazards Consortium
AMPO	Association of Metropolitan Planning Organizations
AoA	Administration on Aging
APA	American Planning Association
ASL	American Sign Language
ATSDR	Agency for Toxic Substances and Disease Registry
BART	Bay Area Rapid Transit District
BCLC	Business Civic Leadership Center
BENS	Business Executives for National Security
C/E	Controller Evaluator
CAEP	City Assisted Evacuation Plan
CDC	Centers for Disease Control and Prevention
CERT	Community Emergency Response Teams
CLRP	Constrained Long Range Plan
COG	Council of Governments
DCHSEMA	DC Homeland Security Emergency Management Agency
DDOT	District Department of Transportation
DEP	Departments of Environmental Protection
DMS	Dynamic Message Sign
DOC	Department of Commerce
DOD	Department of Defense
DOT	Department of Transportation
EEG	Exercise Evaluation Guide
EM	Emergency Management
EMA	Emergency Management Agency
EMAC	Emergency Management Assistance Compact
EMI	Emergency Management Institute
EOC	Emergency Operations Center
ESF	Emergency Support Function
ETO	Emergency Transportation Operations
EXPLAN	Exercise Plan
FCLRP	Financially Constrained Long Range Plan
FE	Functional Exercise
FEMA	Federal Emergency Management Agency
FSE	Full-Scale Exercise
GIS	Geographic Information System
GOHSEP	Governor's Office of Homeland Security and Emergency Preparedness
HAZMAT	Hazardous Materials
HGAC	Houston Galveston Area Council
HHS	Health and Human Services
HOV	High Occupancy Vehicle
HSEEP	Homeland Security Exercise and Evaluation Program
HSPD	Homeland Security Presidential Directive

IAEM	International Association of Emergency Managers
ICS	Incident Command Structure
ICS	Incident Command System
IHS	Indian Health Service
ITS	Intelligent Transportation Systems
KOIN	Kentucky Outreach and Information Network
LA BEOC	Louisiana Business Emergency Operations Center
LANHA	Louisiana Nursing Home Association
LIDR	Laser Imaging Defining Radar
LRTP	Long Range Transportation Plan
MARAD	Maritime Administration
MATOC	Metropolitan Area Transportation Operations Coordination
MDOT	Michigan Department of Transportation
MJ-LHMP	Multi-Jurisdictional Local Hazard Mitigation Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MSEL	Master Scenario Events List
MSTOP	Multi-State Operation Program
MTC	Metropolitan Transportation Commission
MWCOG	Metropolitan Washington Council of Governments
NADO	National Association of Development Organizations
NARC	National Association of Regional Councils
NASAAEP	National Alliance for State Animal and Agricultural Emergency Programs
NCAA	National Collegiate Athletic Association
NCR	National Capital Region
NDPTC	National Disaster Preparedness Training Center
NEMA	National Emergency Management Association
NEMSA	National Emergency Medical Services Association
NFPA	National Fire Protection Association
NGO	Non-Governmental Organization
NIMS	National Incident Management System
NIPP	National Infrastructure Protection Plan
NJT	New Jersey Transit
NOAA-CSP	National Oceanic and Atmospheric Administration – Catch Sharing Plan
NRF	National Response Framework
NTIMC	National Traffic Incident Management Coalition
OEM	Office of Emergency Management
OES	Office of Emergency Services
PALM	Private Assets Logistics Management
PDM	Pre-Disaster Mitigation
PIO	Public Information Officer
RCCC	Regional Consortium Coordinating Council
RDD	Radiological Dispersion Device
RPO	Rural Planning Organization
RTEMP	Regional Transportation Emergency Management Plan
SCOTSEM	Special Committee on Transportation Security and Emergency Management
SITMAN	Situation Manual
SOG	Standard Operating Guidelines
TEEX	Texas Engineering Extension Service
THIRA	Threat and Hazard Identification and Risk Assessment

TIP	Transportation Improvement Program
TMC	Transportation Management Center
TOC	Traffic Operations Center
TRANSCOM	Transportation Operations Coordinating Committee
TRB	Transportation Research Board