

TRANSPORTATION AND EVACUATION WORKSHOP A SUMMARY

National Association of Regional Councils
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The **National Association of Regional Councils** (NARC) held its second workshop on *Streamlining Cross-linking and Coordination of Transportation and Evacuation Planning among Regional Councils and Metropolitan Planning Organizations* during the NARC 43rd Annual Conference and Exhibition in Denver, CO, to examine the impacts data collection, analysis and implementation have on cross-linking transportation-evacuation planning work at the federal, regional and local levels. NARC, Federal Highway Administration (FHWA) and its participating members, speakers and partners worked, during this workshop, to create a general baseline for data collection and tools that informs transportation-evacuation planning and execution on the local and regional levels. The workshop answered a variety of questions, including:

- What are the available federal data and data tools? How are they used at the regional level for planning purposes?
- How and what data is compiled at the federal, local and regional levels?
- How will the next census impact this data?
- What are the best practices/replicable methods for regional data collection, analysis and implementation?

The workshop was split into two parts – the first focusing on federal resources and offerings and the second highlighting regional activities and examples – to ensure a varied amount of information was shared among the participants.

The Honorable Patti Kay Clapper, Pitkin County Commissioner and NARC Board Member, moderated the workshop, sharing her experiences from a rural, land-locked region with a highly variable population composition and size. Commissioner Clapper introduced each of the speakers and facilitated the workshop.

Panel I: Federal Resources and Tools

Ms. Robin Smith, Transportation Planner, Office of Planning, FHWA addressed how FHWA can serve as a resource in assessing and collecting data that is available through the federal government. She highlighted the areas a planning entity would have to take into consideration for crosslinking transportation and evacuation planning, as well as the varying federal agencies, and available tools and data resources.

Mr. Jeremy Wu, Ph.D., Manager/Assistant Division Chief, U.S. Census Bureau demonstrated the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) and Local Employment Dynamics (LED) as data tools for regional planning organizations and local governments to use in various contexts to incorporate in-depth employment and job information when informing the transportation and evacuation planning process.



NARC
Building Regional Communities



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Panel II: Regional Examples and Activities

Mr. Scott Kellar, Homeland Security Coordinator, North Central Colorado All-Hazards Region explained how his region created their multi-jurisdictional transportation-evacuation plan – the successes, challenges and data needs.

Ms. Marlene Nagel, Director of Community Development, Mid-America Regional Council (MARC) discussed how their joint planning, communications and collaboration is assisted by collecting and using Geographic Information Systems (GIS) data through the use of a regional server.

Mr. Walter Diggles, Executive Director, Deep East Texas Council of Governments (DETCOG) detailed the \$4 million FEMA pilot Regional Hurricane Response project DETCOG is undertaking to develop a long-term hurricane disaster recovery model.

Mr. Bob Hamm, Senior Transportation Planner, Wilbur Smith Associates described the Florida Statewide Regional Evacuation Study Program (SRESP) – the role the regional councils are playing in this effort and how and what data sets are being collected, analyzed and implemented to inform transportation and evacuation planning at the regional and local levels.

Mr. Colby Brown, PTP, Training Director, Citilabs discussed building an evacuation model with the Houston-Galveston Area Council (H-GAC), and focused on the types of data used in the model and other types of data that would be applicable when building similar models.

FEDERAL DATA RESOURCES

Several federal data resources, critical planning items and considerations were discussed, including:

- **The need to incorporate supply, residential population, employment and estimated daytime population.** There are several federal data sources that can help with this, particularly what is derived from Census data.
- **The usefulness of the American Community Survey (ACS) is important to local and regional data collection and implementation efforts.** The ACS indicates the characteristics (not count) of a population, including the services and allocation of resources. This is particularly critical to transportation and evacuation planning because of the household and persons variables determined and available:
 1. Household – i.e. vehicle availability; income; and, poverty status.
 2. Persons – i.e. age; disability status and type; English proficiency; and, place of work.
- **There are multiple federal agencies that have data responsibilities and products available for transportation-evacuation planning efforts:**
 - Federal Highway Administration (FHWA)
 - Research and Innovative Technology Administration (RITA)
 - Bureau of Transportation Statistics (BTS)
 - U.S. Census Bureau
 - Oak Ridge National Laboratory
- **There are many programs, tools and data available or integrated from the federal government, such as:**
 1. *Integrated Public Use Microdata Sets (IPUMS)* is provided in partnership with the University of Minnesota Population Center that collects, harmonizes, distributes and preserves U.S. Census data free of charge. This data set is particularly relevant for large metropolitan areas. After the last census, U.S. Department of Transportation staff prepared a guidance paper on defining Public Use Microdata Areas (PUMAs) for transportation planning purposes. [Click here to access the paper.](#)
 2. *Census Transportation Planning Products (CTPP)* is a set of special tabulations from decennial census demographic surveys designed for transportation planners. CTPP uses ACS data and summarizes the flows between work and home, which will be updated with new data in June 2010. The CTPP offers not only data products, but also trainings, articles, status reports and additional related links. Visit CTPP's website for more information.

3. *Longitudinal Employer-Household Dynamics (LEHD)* is a program within the U.S. Census Bureau that uses modern statistical and computing techniques to combine federal and state administrative data on employers and employees with core Census Bureau censuses and surveys while protecting the confidentiality of people and firms that provide the data. LEHD is a very useful source of place of work and flow data. However, one using the data must be careful to ensure the employment data is for specific offices or franchises rather than one headquarter.

There are multiple benefits of the LEHD tool's "On the Map" function – most importantly the free online availability and the data manipulation – in creating a step-by-step guide to determine and analyze a transportation and evacuation plan. The 2010 Census will assist in making this data more complete, allowing for more user functions to be derived from the tool.

- The online tool allows the user to perform analysis on the data, based on where people work and live, while defining, if desired, cities, counties, states, school districts and legislative districts, and giving descriptions about the workplace and laborshed in real time calculations. This tool's data can be customized to fit a regional planning organization's specific qualifications, be incorporated with other federal information like that from a WIRED Department of Labor (DOL) Workforce zone, or even map the trajectory of a simulated hurricane or tornado path. It's helpful in allowing geographic flexibility and easy visualization of massive amounts of data.
- The availability to manipulate the data in LEHD is beneficial when incorporating other existing data to determine the following dynamics – 1) employment (jobs created or destroyed); 2) location/geography; 3) job flows – with the overlaying of other critical information.

Click here to access the Census Bureau's page on LEHD. Click here for an evaluation on the use of the LEHD tool for transportation planning.

4. *Community Economic Development HotReport* provides access for users seeking economic indicators for individual counties or for the Employment & Training Administration's WIRED Regions. This tool, a collaborative project between U.S. DOL, U.S. Census Bureau, and the U.S. Economic Development Administration, is useful for areas that experience economic disruptions due to natural disasters, plant closings, base closings, and other economic changes, such as abrupt increases in employment, to show pertinent economic indicators in unified online reports from many data sources, including:
 - Economic: industry wages; top industries; top occupation groups; labor force by age; and, education levels.
 - Housing: mortgage averages; occupancy status; ownership rates; and, housing costs.
 - Demographic: income; population pyramid; and, school enrollment.
 - Transportation: commute times and means of transportation.
 - Community Assets: public schools and colleges and universities.
5. *Transportation Research Board (TRB) Subcommittee on Census Data for Transportation Planning* has a site developed to help provide a forum for those with an interest in transportation planning and census data. The focus of the Subcommittee spans the entire spectrum of census related activities including applied uses of the data, the content of censuses, collection procedures and dissemination programs all within the context of past, present and future censuses.

REGIONAL ACTIVITIES & EXAMPLES

Regional transportation-evacuation professionals cited their on-the-ground integration of various data for planning purposes:

- **Creating an all-hazards, regional transportation and evacuation plan requires a variety of data, taking into consideration factors that may go beyond the normal scope of regional planning.**

Mr. Scott Kellar explained the importance of an all-hazards regional emergency management and evacuation plan that includes multi-jurisdictional organizations and local governments as key to all activities, allowing local governments an opportunity to build their own pieces to fit into a larger regional plan, as well as the necessity of involving the regional Department of Homeland Security Urban Area Security Initiative (UASI) group, the Denver Regional Council of Governments (DRCOG), Denver Regional Transportation District (RTD) and other partners. With this as the base, Mr. Kellar detailed their efforts to incorporate various planning assumptions to create an overarching analysis for the entire region, which then allowed for examining the threat of individual hazards. The plan utilized population data from DRCOG and started to look at how to control movement of people into different areas of jurisdiction, including these factors as required planning data. One major activity in creating this transportation evacuation plan was a traffic management analysis undertaken by the all-hazards region. This analysis used available data sources – local, state, regional and federal – such as:

- Currently identified evacuation routes;
- Traffic flow and control;
- Reversing interstates;
- General weather patterns;
- People without vehicles and capacity of public transit; and,
- Fuel management/available supply.

When examining these data sets, Mr. Kellar detailed the need for more information surrounding reversing interstates in relationship to public safety concerns. Mr. Kellar indicated the All-Hazards' planning efforts to include data on sheltering and logistics support points, long travel times and distances, and special needs population factors.

Mr. Kellar's All-Hazards region experienced several challenges where data, funding and increased coordination with public and private partners would help in a better harmonized transportation and evacuation plan. For example,

- Bus and transit needs outstripped capacity;
- Logistical support required more attention and resources;
- Increased school coordination would assist in getting larger numbers of people out quicker;
- Sheltering facilities necessitated more personnel; and,
- Hospitals needed to coordinate their evacuation plans with the larger regional plan.

Some of the critical lessons learned from the all-hazard's transportation and evacuation planning exercise are:

- Multi-jurisdictional coordination and integration is required;
- The Incident Command System (ICS) Structure** is necessary for supporting evacuations;
- Incident-specific evacuation planning assists in coordinated, large scale evacuations; and,
- Detailed logistical analysis with up-to-date data is required.

**ICS is the model tool for command, control, and coordination of a response and provides a means to coordinate the efforts of individual agencies as they work toward the common goal of stabilizing the incident and protecting life, property, and the environment. ICS uses principles that have been proven to improve efficiency and effectiveness in a business setting and applies the principles to emergency response. [Click here for more information on ICS.](#)

- **Establishing a regional server tied to Geographic Information Systems (GIS) greatly assists regional planning efforts in the areas of transportation, environment and emergency services.**

Ms. Marlene Nagel discussed the evacuation planning considerations used by the Mid-America Regional Council (MARC), a nonprofit association of city and county governments that serves as the metropolitan planning organization for the nine-county, 120-city, bistate Kansas City region and is governed by a board of local elected officials. The specific considerations used by MARC, in cooperation with their local governments, to conduct regional transportation and evacuation planning includes:

- Risks to the region;
- How to support local efforts through regional support;
- Looking at factors regionally, i.e. sheltering, special needs populations, transportation; and,
- Creating a comprehensive regional coordination guide.

In doing this, MARC went through a strategic planning activity and determined that creating and using a Geographic Information Systems (GIS) program would work well for their region's homeland security needs. The establishment of a KC Metro GIS Consortium, composed of local GIS managers who develop policies and technical standards for sharing GIS information at the regional level, allowed the development of a server which would enable data gathering, sharing and analysis from one central point. In this process, MARC and the Consortium examined:

- What would be the right data to collect?
- How could it be shareable?
- How could it be secured?
- How could it be integrated into day-to-day and pre-established operations?
- How can it feed into interoperability efforts?

GIS uses detailed computer files that allow users to visualize information as multiple layers of data overlaid on a map. For example, a GIS file might begin with a background layer that shows detailed aerial photographs of the region. Subsequent layers could include street maps, utility lines, population and demographic data, land uses, the location of fire and police stations, transit routes or any other information with a geographic component.

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This regional data server, which brings together local cities and counties, state, federal and private sector partners to map the appropriate and available data for a variety of homeland security functions, is housed in one of the region's local emergency centers. This allows for the data to be flexible (for multiple applications) and available at any time, and for the local governments to maintain overall control. The GIS data layers stored on MARC's regional data server are pulled for many products and applications, and focus on certain types of mapping for both incident- and geographic-specific planning.

In addition to developing and sharing GIS data regionally, MARC is completing work on a web-based application that allows non-GIS professionals to utilize the GIS resources for emergency response applications. This data will be able to be tied to another region's data through street, aerial, Google ® or topography maps. In fact, this effort is working across the regional border with Missouri because of the impacts of any potential activity surrounding the New Madrid Fault and the possibility of Kansas receiving its evacuees.

This web-based application will create four different types of incident reports; allow a better understanding of the infrastructure and community assets; assess post-incident damages; and, allow users to see demographics. This effort and the sharing GIS files will allow the region, for the first time, the creation of a regional map that can seamlessly zoom all the way from the broad, eight-county "big picture" down to individual parcels, the smallest units of land ownership. MARC and KC Metro GIS are working with local governments to develop a system for sharing GIS files to maximize their usefulness to public decision-making.

- **Producing a long-term disaster response model through specific data collection assists in post-incident regional and local recovery.**

Mr. Walter Diggles of the Deep East Texas Council of Governments (DETCOG), a voluntary association of local governments (counties, cities, and school districts) that provides a wide range of services to the citizens of deep East Texas, detailed his organization's engagement in a \$4 million Federal Emergency Management Agency (FEMA) pilot project to create a long-term recovery model to assist citizens post-Hurricane Ike (September 2008). In this effort, DETCOG began collecting data to create the recovery model and assist citizens, including:

- An assessment of needs;
- Development and implementation of plans that assist in restoring citizens to pre-hurricane conditions; and,
- Determining and referring citizens to appropriate service providers.

DETCOG is still working through the project and has found that in order to institute long-term recovery, the following must be incorporated into evacuation planning post-incident to ensure the survivability of citizens:

- Available and safe housing that leads to a long-term, sustainable solutions;
- Basic furniture and supplies;
- Job training to restore the ability to gain employment;
- Assistance with physical or mental health resources;
- Interpretation services for non-English speakers;
- Financial counseling;
- Transportation for employment purposes; and,
- Utility deposits or installation fees.

The two lists above are relevant data that, in the experience of DETCOG, should be gathered and incorporated into the evacuation and post-disaster recovery plan. Establishing a data system to address these elements, as well as immediate disaster transportation and evacuation considerations, will create a comprehensive plan that reflects real life experiences and needs.

- **Creating a replicable regional evacuation response model with regional planning organizations at the center of data collection, analysis and implementation is vital to integrating transportation and evacuation planning.**

Mr. Bob Hamm is working on the Florida Statewide Regional Evacuation Study Program, which is lead by the Florida Department of Emergency Management and includes the eleven Florida regional councils as agency partners. This study will determine and update the state's hurricane regional response evacuation plans. This program, which is expected to be completed later this year, will utilize consistent methodologies and format to ensure complete transparency and visibility in data collection and analysis. This effort is being conducted in two phases:

Phase 1 is about 95 percent complete and provides for data on Demographic and Land Use Analysis; Critical Facilities Inventory; Hazards Analysis; Vulnerability, Behavioral, Shelter and Regional Evacuation Transportation Network Analyses; defining relevant terms; and, GIS. This effort will yield updated basis for plans and mitigation strategy.

Phase 2 is 35 percent complete and provides for the collection of topography data and new modeling efforts, as well as a vulnerability analysis of the delineation of the storm tide limits and evacuation zones, identification of population-at-risk and evacuation populations, storm surge analysis of critical facilities and the evacuation transportation analysis. This effort will develop impact methodology and evacuation zones impacts assessment tools.

When undergoing these data collection and analysis tasks, particularly in Phase 1, the Florida partner agencies realized it was very difficult to collect data in some of the small, rural regions, as well as the larger, more diverse urban regions. However, the model structure and data collection sets and efforts are working to create the model structure from the regional level throughout the state.

For more on the Florida Statewide Regional Evacuation Study Program, please contact Jeff Alexander, project manager, at jalexander@nefrc.org.

Mr. Colby Brown is working with the Houston-Galveston Area Council (H-GAC) to develop a “Strategic Hurricane Evacuation Model,” as a response to the multiple evacuation issues experienced in the region due to Hurricane Rita. H-GAC coordinated with various governmental agencies to develop a hurricane evacuation plan and, from that, was asked to develop a tool for evacuation planning. The goals of this model or tool, which would stimulate how traffic spreads throughout the area, were to:

- Simulate the Rita evacuation;
- Provide evacuation demands;
- Estimate traffic volumes and delays;
- Maintain sensitivity to various scenarios and plans; and,
- Apply it to non-evacuation planning (corridor, sub-area, ITS, etc).

In accomplishing these goals, H-GAC encountered challenges such as the lack of survey data from Hurricane Rita; the varied evacuation demands (i.e. time periods, origin and destination); and, the interaction between evacuation, normal daily, and non-evacuation traffic. The H-GAC approach created a tool that focuses on major routes and is linked into the regular regional planning model, requiring information on evacuation trip estimations and background trip estimations. The project benefited from having some useful data available such as the origin-destination survey; Houston Transtar speed information; and, regional travel demand model data set. However, according to their experiences, additional data would have helped, including:

- More accurate data during evacuation;
- More complete GIS network information;
- Hourly traffic variations for the typical weekday;
- Ongoing enhancements;
- Refinements to zone system, user classes, and transportation network coding accuracy;
- Hybrid equilibrium / incremental algorithms; and,
- Detailed and statewide model efforts.

Resources Recommended

(Note: Many resources are included throughout the summary)

U.S. Federal Highway Administration - www.fhwa.dot.gov/

U.S. Census Bureau - www.census.gov

North Central All-Hazards Region - www.ncrcolorado.org/

Mid-America Regional Council – www.marc.org

Deep East Texas Council of Governments - www.detcog.org

Northeast Florida Regional Council - www.nefrpc.org

Wilbur Smith Associates - www.wilbursmith.com

Houston-Galveston Area Council - www.h-gac.com

Houston Transtar - www.houstontranstar.org

Citilabs - www.citilabs.com

WORKSHOP LESSONS LEARNED AND DATA BASELINE

Data is central to informing and cross-linking transportation and evacuation planning. There are multiple sources and ways of collecting data depending on the size, capacity, funding and staffing of any particular planning organization, but many presenters noted and exemplified the strength of coordinating these efforts through regional planning organizations (both Councils of Governments and Metropolitan Planning Organizations) in order to provide for the most complete and functional regional evacuation models. Taking the information from the workshop presenters, many basic data elements or sets should be looked in order to create a general baseline for cross-linking transportation and evacuation planning, including:

- Possible hazards/risk assessment;
- Demographics and Population Characteristics (local surveys);
 - Vehicle availability
 - Age
 - Race
 - Disability status and type
 - English proficiency
 - Residential, Daytime or Tourist/Non-permanent
- Population Evacuation Behavior (local surveys);
- Land Use Assessment;
- Community Assets and Critical Facilities (i.e. schools, universities, transit, hospitals, street maps, utility lines etc.);
- Shelter Capabilities;
- Commuter Shed flows (work-to-home travel patterns);
- Topography;
- Evacuation routes;
 - Traffic flow and control
 - Estimates of vehicle movements
- Fuel management/available supply; and,
- Relevant and consistent terminologies.

Putting this information into a sophisticated modeling program and linking it to other regions will begin determining the baseline for region evacuation systems that respond to the needs of a region's local governments, citizens and businesses, and their safety and sustainability given any type of event.