REVIEW AND ASSESSMENT
A Look at Virginia's Hurricane Planning and Preparedness

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT
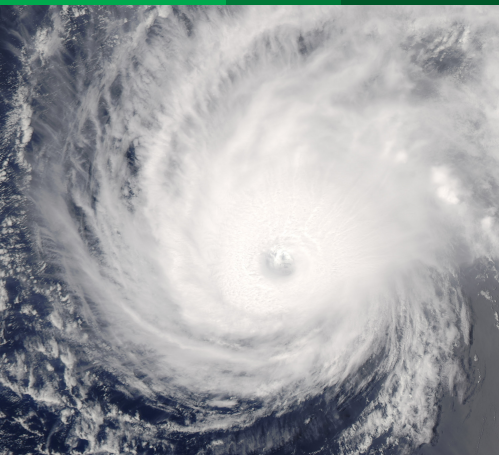
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Witt O'Brien's was contracted to provide strategic insight into the Commonwealth of Virginia's In Season Hurricane Review in the Hampton Roads region.

Since our founding, Witt O'Brien's has managed disaster response and recovery efforts in the wake of some of the largest and most complex storm-related disasters in U.S. History, including Hurricanes Katrina, Rita, Gustav, Ike, and Superstorm Sandy. Witt O'Brien's has helped develop, staff, and implement long-term recovery planning and coordination efforts for multiple states, as well as local jurisdictions that have been significantly affected by disasters. We rely on our reputation and proven record for out-of-the-box thinking, the use of program flexibility and past precedents, and the development of collaborative solutions for our clients to resolve problems.

Witt O'Brien's experience includes not only development of hurricane response and recovery plans but also implementation of these plans during actual hurricanes. Witt O'Brien's has conducted assessments and gap analyses, developed comprehensive Emergency Operations Plans, and conducted training and exercises for governments, private companies, and universities across the United States. We bring our hands-on experience to this high-level review of the Hampton Roads region.

In the post-disaster phase of an event, there is normally a point where public safety professionals identify that the community at-large was not as well prepared as anticipated. The Virginia Department of Emergency Management (VDEM) has taken a proactive pre-disaster role to look at the hurricane planning in the Commonwealth to identify strengths and areas for improvement. As a part of this review, Witt O'Brien's was contracted to provide strategic insight into the Commonwealth of Virginia's in-season review of existing approaches to hurricane preparedness and response specifically addressing the Hampton Roads region.

Overall, public safety agencies across Virginia have made a noticeable commitment to hurricane planning and preparedness. As part of that commitment, local, regional, and Commonwealth partners continue to examine ways to improve their existing efforts. This review explores whether the In-Season Hurricane Planning Enhancements developed by VDEM are sufficient to enhance preparedness in the Hampton Road region. VDEM created five working groups made up of key stakeholders to address the following areas:

- Situational Awareness/Information Sharing
- Evacuation
- Sheltering
- Citizens Needing Assistance
- Public Information

The working groups came together to discuss and develop short-term enhancements that could be made to address challenges in the existing hurricane preparedness and response plans. In addition to the stakeholder engagement, Witt O'Brien's conducted a third-party review of hurricane preparedness planning activities in the Region and across the Commonwealth. The stakeholders participating in the In-Season Hurricane Review are faced with different challenges and deficiencies in different areas (i.e. shelter locations, information sharing, evacuation priorities, evacuation zones, situational awareness, communication and coordination).

The involvement of stakeholders in various stages of the policy process has had a positive impact, as has strong communication and coordination among the local, regional and Commonwealth partners. A balanced mixture of supporting mechanisms (funding, regulation, policies in other areas, communication and information exchange) are crucial to the successful implementation of the In-Season Hurricane Enhancements.

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EXECUTIVE SUMMARY

This In-Season Hurricane Review assessed hurricane preparedness activities throughout the Commonwealth of Virginia, specifically focusing on Hampton Roads. The extent to which key objectives are fully implemented varies at the local, regional, and Commonwealth level. Are the In-Season Enhancements developed by VDEM the right ones? The degree to which these enhancements are achieved is still partly an open question.

There is a difference in the level of implementation between the local jurisdictions, regions, and VDEM. While some jurisdictions have shown considerable progress in implementing action areas, others have still to start on some. This creates different speeds of implementation and varying levels of commitment.

The critical question about outcomes of the hurricane planning and preparedness activities was validated at the exercise on August 5, 2014. The key strategic issues including sheltering, evacuation, lane reversal (contraflow), and public information have not yet been addressed in a way to increase the performance during a disaster. The architectural elements of hurricane planning are necessary to establish a long term plan to strategically achieve the goals of hurricane preparedness.

Many of the short-term enhancements are good, but there is still room for improvement. One area is that of Recovery. The process of developing and implementing a Recovery Plan following disaster response can have major benefits for a community, including:

1) A faster and more efficient recovery,
2) Seizing the opportunity to build back better,
3) Reducing community anguish, and
4) Local control over the recovery process, which can go on for years.

As all Virginia public safety agencies continue to implement many of the enhancements, they are determining the feasibility of implementing the key strategic issues. These key strategic issues identified are part of this report's recommendations but require a long-term strategy to achieve the desired outcomes. The most advantageous approach would be to utilize the working groups and develop one strategic planning group with a focus on hurricane planning and preparedness.

Witt O'Brien's commends the Commonwealth of Virginia's initiative to take on these critical tasks to enhance life safety and hurricane preparedness for the visitors and residents of Virginia.

METHODOLOGY

VDEM requested that Witt O'Brien's focus on six aspects of hurricane planning in the region. Those aspects are:

- Public Information
- Information Sharing and Situation Awareness
- Sheltering
- Evacuation
- Citizens Needing Attention
- Lane Reversal (contraflow)

Utilizing a comprehensive program assessment and planning approach, Witt O'Brien's conducted a review of the Commonwealth of Virginia's local, regional, and state plans and related documents to assess their functionality, viability, and potential for success. The analysis utilized a variety of tools that are based on federal guidance, as well as industry "best practice" emergency management planning fundamentals.

Witt O'Brien's used multiple methods to collect information on current capabilities, policies and procedures, and planning objectives within the Hampton Roads region and the Commonwealth of Virginia including:

- *Written Plans and Procedures:* Witt O'Brien's requested current emergency plans and procedures pertaining to the preparedness, mitigation, response, and recovery to hurricane planning. This document request included all relevant plans and annexes; such as emergency response, evacuation, and sheltering procedures.

- *Historical Documentation:* Witt O'Brien's requested after action reports from any/all previous exercises and incidents, training data, and improvement planning milestones at the local, regional and state level.

- *Stakeholder Interviews:* Witt O'Brien's conducted interviews and met with emergency management and public safety stakeholders at the local, regional, and state levels. Special attention was given to emergency management stakeholders in the Hampton Roads area regarding the emergency response structure and capabilities in that area.

- *Lessons Learned and Best Practices:* Witt O'Brien's conducted a lessons learned and best practices study which included interview with state and local emergency management professionals in hurricane-prone areas around the country including neighboring states

and communities whose plans and operations could directly impact the Commonwealth of Virginia.

- *Workshop/Exercise:* Witt O'Brien's conducted a validation exercise, at which state and local-level stakeholders discussed the strengths and weaknesses of current plans, policies, and procedures. This exercise was an opportunity to identify high priorities, strengths, weaknesses, and opportunities as it pertains to hurricane planning.

This report contains findings and recommendations as a result of the in-season review, as well as best practices and lessons learned from other states, regions, and local jurisdictions with similar geographic and demographic risks and vulnerabilities.

PRACTICES IN OTHER STATES

Every state is susceptible to natural hazards whether threatened by earthquakes, floods, high-winds, hurricanes, severe winter weather, thunderstorms, tornadoes, or tropical storms. Relevant hazards need to be considered when creating an emergency plan and specific procedures should be included for public communication and notification, information sharing through a common operating picture, evacuation, and sheltering. In addition, taking mitigation measures, such as improving infrastructure resilience will ensure a more prepared state and aid in effective response and recovery efforts.

A.   Maryland

Ocean City Evacuation Planning
Evacuating those without access to a personal vehicle presents a challenge to emergency managers. In Ocean City, Maryland, a program exists to evacuate J-1 Visa Workers as a group. J-1 Visas are a category for non-immigrants approved to participate in a work-and-study based exchange visitor program. This J-1 Visa group in Ocean City is mostly young adults from Europe working primarily in the food and lodging industry during the summer tourist season but may not have personal transportation, or personal evacuation and sheltering plans. Ocean City's Plan for this group is clearly spelled out in the City Orientation Handbook, given to each J-1 Visa holder at the beginning of their seasonal employment[1]. When a hurricane evacuation is imminent, this group is directed to muster at a central location in the City where evacuation buses take them to a shelter in Baltimore. When the danger has passed they are returned by bus back to Ocean City.

B.   Florida

State of Florida Evacuation Planning
Evacuations depend heavily on surface traffic through the limited capacity of the roads and transportation infrastructure. In the event of voluntary evacuations, there is no actual lane reversal, and the shoulders of the road are used as travel lanes. This is the case for Florida, Louisiana and Mississippi.

The State of Florida and its local jurisdictions have public-private and whole-community partnerships as well as seats within the County and State Emergency Operations Centers to accommodate these partnerships. All counties within the state of Florida have been

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[1] http://www.ocworkforce.com/pdf/seasonal-workforce-handbook.pdf

provided with a local/regional hurricane evacuation guide publication which is available for residents of each county.

Generally, Florida only institutes evacuation procedures for hurricanes. Tourists and visitors are informed of evacuation when the storm is about three days out to allow tourists to leave the earliest. Additionally, those in low-lying areas and factory-made homes are informed when the storm is two days out. After that, evacuation is based on the anticipated storm surge and/or wind strength. Evacuation orders in Florida are authorized by county-level Emergency Management Directors.

South Florida local governments have identified and sometimes utilized, evacuation zones for the general population to follow. South Florida utilizes tiered evacuation orders in the sense that some areas will be under a voluntary evacuation and other more vulnerable areas will receive a mandatory evacuation notification.

State of Florida Lane Reversal
The State of Florida conducts one-way (re-named as such from the previous term "contraflow") evacuation operations when required. The following highways each has its own one-way plan:

- I-10 westbound from Jacksonville
- SR-528 westbound from Brevard County
- Florida's Turnpike northbound from Lantana (Palm Beach County)
- I-4 eastbound from Tampa
- I-75 from Tampa to Wildwood
- I-75 eastbound from Fort Myers
- I-75 westbound from Fort Lauderdale

A critical goal of any evacuation is to ensure that people are taken to a safer area. The principal cause of fatalities from hurricanes is not wind, but storm surge, so evacuees must be moved away from the most threatened coastal areas. When coupled with the uncertainty of a hurricane's projected path and point of landfall, I-10 in the Panhandle and I-95 along the eastern seaboard, which both roughly parallel the Florida coast, cannot reliably take evacuees out of harm's way. Therefore, these routes do not have One-Way Evacuation plans.

The principle indicator that a One-Way Evacuation may be needed is when the number of evacuating vehicles increases to the point that travel speeds drop significantly and there is traffic congestion. Besides firsthand reports from personnel along the route, the Florida Department of Transportation (FDOT) relies on other tools to assess traffic conditions,

such as traffic count stations and closed-circuit television cameras positioned along the highway.

The main benefit of a One-Way Evacuation Operation is the ability to use the maximum number of highway travel lanes possible for evacuating people from a threatened area. This increases the amount of traffic that the highway can accommodate during an evacuation when it is likely that more cars will be on the road. Conversely, there are some drawbacks. There is the risk that overwhelming congestion will occur at the beginning and end of the One-Way Evacuation route, and that evacuees may, at worst, still be on the highway in their vehicles when the storm hits. There are safety concerns about traffic flowing in the reverse direction on a segment of highway. Such highway features as signs, guardrails, and interchanges are designed for vehicles traveling in a particular direction. There are additional safety implications in asking evacuees who are already stressed and fatigued to drive on the wrong side of the road.

The One-Way Evacuation operation in Florida was designed to begin immediately after sunrise to take full advantage of daylight hours. Later in the day, the reversed lanes are closed at the starting point to allow time for the last cars in line to clear the One-Way Evacuation termination before dusk. If a One-Way Evacuation is declared for a specific location, FDOT and Florida Highway Patrol (FHP) have a minimum of 24 hours to prepare the route and assemble their equipment. During this time, advisories are continually sent out through public communications outlets such as radio, television, internet, etc.

The One-Way Evacuation route is designed to begin at a certain point, typically at a paved crossover in the highway median. It will conclude at a predetermined location where the traffic on the reversed lanes crosses the median back to the regular side of the road, or is merged on to another highway. All of the one-way routes in Florida terminate at a major interchange connecting two freeways. This allows travelers to crossover to the correct lanes seamlessly without disrupting the traffic flow too much. Signs along the route will provide instructions on where to exit and what facilities are available for food, fuel and rest stops.

Evacuation is a critical aspect in a state containing a majority of coastal and low-lying areas, such as Florida. Therefore, a comprehensive plan is required to ensure a successful and safe evacuation. Much effort has been placed into the One-Way Evacuation Operations Plan. FDOT maintains the plans and there are adequate resources (personnel and equipment) to execute the plan when required. In addition, the success of Florida's one-way evacuation operations plan can be attributed to:

1. *Public Information:* The state provides public outreach, providing evacuation information specific to one-way operations. It has also developed OneWayFlorida,

an outreach initiative designed specifically to provide detailed information on One-Way operations and evacuation routes.

2. *Highway Advisory Radio System:* Those within One-Way evacuation areas can tune into the local broadcast stations, posted on permanent signs all along the highways, to hear local traffic conditions as well as instructions on any current One-Way evacuation operations.

3. *Adequate capacity one-way lane terminations:* The reason one-way routes terminate at freeway-to-freeway interchanges is to ensure there is an outlet for traffic to merge onto another major freeway or continue on the same freeway by merging into regular lanes by means of the cross-over ramps. This has helped in alleviating the issues associated with "bottlenecks" at one-way termination points.

Miami Dade County Evacuation Planning

Miami Dade County's implementation of evacuation protocol depends on the category of the storm and what has been determined by using a tool known as the Storm Action Lead Time (SALT). This tool is utilized as a checklist and operational guide for hurricanes. Evacuation orders, should there be any, are authorized by the Mayor or a designee of the Mayor's choosing. Evacuation zones have been identified and can be accessed by the public through Miami Dade County's government operated website[2].

Tiered messages about evacuation are no longer sent, meaning that the message does not designate a voluntary or mandatory evacuation because the public's understanding of these orders have been known to cause confusion. Evacuation is led/operated by government agencies, but partnerships within the community for sheltering initiatives do exist. No formal point-to-point agreements are in place, but the county participates in a statewide evacuation roadway network and statewide sheltering plan.

Miami Dade County Special Needs Registry Evacuation

Members of the special needs population are evacuated utilizing the Transit Bus, Public School Buses, Fire-Rescue ALS units, private ambulances, and private paratransit services which are coordinated through the Evacuation Support Unit within the EOC. Private sector representatives for the applicable organizations, including hospitals are also included in the EOC[3].

One of Miami Dade County's best practices related to evacuation is their partnership with the Greater Miami and the Beaches Convention and Visitor's Bureau (GMCVB) which allows

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[2] http://www.miamidade.gov/fire/library/OEM/evacuation-zone-map-2013.pdf
[3] http://www.miamidade.gov/hurricane/library/hurricane-guide.PDF and
http://www.miamidade.gov/fire/evacuations.asp

the county to keep tourists out of public shelters by using a brother/sister hotel concept[4] to provide hotels that can accommodate the tourists outside of the evacuation area.

Miami Dade County Lane reversal (contraflow)/Lane Reversal

Miami Dade County does not have a local plan for lane reversal (contraflow). If a plan was implemented, it could cause more harm than good because of traffic bottlenecks and the inability to clear the traffic off the roadways. The state lane reversal (contraflow) program is managed by the Florida Department of Transportation, and the Governor has the authority to initiate lane reversal (contraflow) on state roads.

Florida Hurricane Sheltering

In an effort to be adequately prepared, evacuation shelters have been identified around the state for individuals to use. Due to the low-lying areas the where many of the shelters are built, the American Red Cross has refused to work in many of these shelters prior to the hurricane making landfall. The state prefers that members of the community shelter locally and programs have been set up to accomplish this. Additionally, each county is working on alternative resources to accommodate the anticipated number of evacuees during a particular evacuation incident. Support has come from various private sector entities, NGOs, worship groups, etc. who help support sheltering programs.

Florida Public Information

When a hurricane is approaching, Florida utilizes the news media, radio, and social media through press releases to engage and inform the public. Generally, the Florida population maintains hurricanes awareness, and the press releases reach a majority of the population. However, it is not clear how many people actually act upon the provided information. Efforts have been made to make these messages redundant and reach those who do not utilize conventional forms of mass communications. Although social media gets the message out fast and to a lot of people, there is difficulty in hitting migrant populations and the populations that speak languages other than English and Spanish. In an effort to improve information dissemination, there is a person designated as being responsible for social media outlets and programs that reach out to the population through smartphone technology.

Miami Dade County Public Information

To notify the public, Miami Dade County utilizes television and radio media, Miami-Dade Alerts which reaches individuals through smartphones[5], IPAWS/CMAS, and social media. Use of these different systems provides redundancy designed to reach as many people as possible when alerting the public of a threat. So, even if people do not use conventional

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[4] http://www.miamiandbeaches.com/
[5] www.miamidade.gov/alerts

forms of communication, the hope is that the message will get to them due to public information being disseminated in English, Spanish and Creole (the three primary languages spoken in the county). Additionally, the County's Community Information & Outreach Department monitors social media during hurricane activations.

Jacksonville/Duval County Public Information
The City of Jacksonville has implemented a smartphone application called *JaxReady* which advertises that it will "help you monitor weather threats and plan for evacuation in the event of a natural disaster". *JaxReady* provides access to current threat levels, weather reports, wildfire updates, as well as up-to-the-minute news feeds for emergency preparedness and evacuation. Where *JaxReady* differs from many other smartphone preparedness applications is in its real-time GPS location service. *JaxReady* can track and advise any use on their location in reference to evacuation zones, so there is never any question about evacuation by zone and whether an individual knows which zone they are in. The application will track movement and advise users when they have moved out of a given evacuation zone and into another, or out of the zones altogether. This type of interactive mapping can reduce the number of evacuees and potentially limit the distance evacuees must travel to safety. The *JaxReady* application also provides easy access to the special needs registration for those with special medical needs during an evacuation, as well as the local telephone emergency notification system registration.

C.   Texas

Texas Evacuation and Lane reversal (contraflow)
In Houston Texas, evacuations are ordered based on zip codes. This easily identifies whether or not a certain area is affected and allows for a staggered evacuation. It can also allow for a quicker movement of people. The region has four areas that are classified based on their level of vulnerability to storm surge.

Once residents have determined whether or not they live in a hurricane evacuation zone and which route they should take to leave town, Emergency Managers encourage residents to become familiar with the Hurricane Evacuation Lane reversal (contraflow). During hurricane evacuations and at the discretion of the county judge, inbound lanes of local freeways can be reversed to allow vehicles moving outbound to do so faster. Some lanes normally closed to regular freeway traffic are also opened to help speed evacuations, these "evaculanes" are designated with a blue circular shield on the roadway.

If a person lives in a mandatory evacuation area and is unable to evacuate, they are encouraged to register for the State of Texas Emergency Assistance Registry (STEAR). This

confidential registry allows local emergency responders to locate registered residents and provide them with emergency assistance during the disaster.

Texas utilized lane reversal (contraflow) lanes in 2005 for Hurricane Rita. It was one of the largest evacuations in United States history. Compounded with gridlock, gas stations running out of fuel on the evacuation route and the 100 degree heat, the results were devastating.

The evacuation from Hurricane Rita in Texas was complex due to a number of factors. The change in the path and course of the hurricane meant that a greater number of people were evacuated than necessary. Traffic congestion was compounded along the evacuation routes when the inland counties were put on mandatory evacuation, which also contributed to increased traffic and related traffic management issues on rural roads.

The congested highways hampered emergency vehicle capabilities to respond to medical emergencies. The long evacuation times caused vehicles to run out of fuel to be left stranded on the roadways. When the evacuees reached their rural destinations, the demands for food, water, ice and restrooms overwhelmed the supply.

These problems encountered with Hurricane Rita are issues that need to be addressed with hurricane planning. Following this, Texas created regional command centers to improve communication and control during an evacuation. In addition, they coordinate fuel availability and distribution, and monitor traffic flow along the evacuation routes.

D.   Mississippi

Mississippi Lane reversal (contraflow)/Lane Reversal
Louisiana and Mississippi have a unique plan for shared hurricane evacuation. Due to its small coastal population, Mississippi does not utilize lane reversal (contraflow) within its own borders since its roadways can handle evacuation traffic without modification.

The city of New Orleans, Louisiana, is a major population center with some identified evacuation routes leading into Mississippi. The two states have coordinated their lane reversal (contraflow) operations to avoid confusion and disruption through their regional traffic control centers and provide shared communication between the two states. Hurricane evacuation in Mississippi works differently than in Louisiana based upon many factors including the strength and estimated path of a landfalling hurricane.
With the cooperation of both Governors of Louisiana and Mississippi, evacuation orders and lane reversal (contraflow) in both states are enacted under specific guidelines.

For Mississippi residents evacuating from an imminent storm threat, all roads inside the state will remain in normal travel directions, with the exceptions of Interstates 55 and 59 when a lane reversal (contraflow) order is issued by the Governor of Mississippi upon the request by the Governor of Louisiana.

During a Louisiana lane reversal (contraflow) where I-55 and I-59 are used for evacuation, Mississippi enacts a two-option evacuation plan:

- **Option A** (also known as "Miss. Level 4 Evacuation"): Lane reversal (contraflow) only occurs inside the Louisiana borders. Lane reversal (contraflow) traffic on I-55 and I-59 in Louisiana will revert back from all lanes heading north (northbound lanes plus southbound lanes used in lane reversal (contraflow) heading north) to normal traffic flow prior to motorists crossing the Louisiana/Mississippi state line. I-55 and I-59 traffic heading southbound from Mississippi into Louisiana will be closed at the state line.

- **Option B** (also known as "Miss. Level 5 Evacuation"): Lane reversal (contraflow) will be ordered by the Governor of Mississippi heading northward past the Louisiana state line into Mississippi. Lane reversal (contraflow) will be extended to Mile Marker 31 (near McComb) on I-55 and to Mile Marker 59 (near Hattiesburg) on I-59. All Mississippi motorists driving north to south on the interstates will be directed to U.S. and Mississippi State highways prior to those Mile Marker points. Louisiana residents evacuating north on the interstates in Mississippi will have access to the U.S. and state highways via "Service and Non-Service" exits along the interstate lane reversal (contraflow).

E.   Louisiana

Louisiana Lane reversal (contraflow)
Louisiana and Mississippi have a unique plan for shared hurricane evacuation. The city of New Orleans, Louisiana is a major population center with some identified evacuation routes leading into Mississippi. The two states have coordinated their lane reversal (contraflow) operations to avoid confusion and disruption.

Louisiana made several improvements to their Lane reversal (contraflow) Plan including the following:
- Coordinated evacuations
- Phased evacuations based on geographic susceptibility
- Increased traffic management by additional signage, alternate routes
- Recognize congestion is going to happen and increase timeline

- Educate and inform the public on the realistic expectations
- Provide real time information to the media on a regular basis
- Established a Traffic Control Center
- Stationed tow vehicles along the evacuation routes
- Changed plan from 8 freeway/expressway lanes to 11 lanes
- Extended the lane reversal (contraflow) into segments of Mississippi

State of Louisiana Public Information

In the wake of Hurricanes Katrina, Rita, Gustav, and Ike, the State of Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) developed a Community Education and Outreach program called "*Get a Game Plan*". Much like the *ReadyVA* and *ReadyHR* programs that are in place in Virginia, the *Get a Game Plan* program helps residents and businesses prepare, mitigate, and respond to emergencies. As part of the public information program, *Get a Game Plan* incorporates detailed step-by-step instructions for individual resiliency that include putting together an emergency kit, making preparations, and staying informed. The latter of which provide multiple means for residents and businesses to receive notification and messages. Evacuation information is provided in English, Spanish, and Vietnamese to address the needs of populations where English is a second language. The program also provides preparedness measures for children with guidance on creating and emergency supply kit, making a family emergency plan, and knowing the facts about hazards that could impact the state.

The *Get a Game Plan* program includes a program guide and materials for use at the local level, academic program materials for distribution and delivery to school age children, and a variety of public service announcements (PSAs) used on broadcast television that points people to the *Get a Game Plan* website and encourages developing a family emergency plan. The PSAs were created with a common message and highlight local celebrities, sports figures, and political leaders who encourage and endorse the resiliency program.

LES MILES
LSU COACH

www.GetAGamePlan.org

New Orleans Evacuation Planning

Evacuteer.org is a non-profit organization incorporated by the State of Louisiana on June 8, 2009, and approved as a 501©3 tax-exempt entity by the IRS on August 17th, 2009. Evacuteer.org recruits, trains, and manages evacuation volunteers (evacuteers) who assist with New Orleans' public evacuation option called City Assisted Evacuation Plan (CAE). CAE activates when a mandatory evacuation is called in the city of New Orleans and is designed to move 25,000-30,000 New Orleanians without transportation in advance of a Category 3 or higher hurricane. The City has successfully implemented the plan once, in advance of Hurricane Gustav (Sept. 2008), when 18,000 residents utilized the CAE. Evacuteer.org is an organization created out of lessons learned from that experience. Through an existing agreement with the City of New Orleans Office of Homeland Security and Emergency Preparedness (NOHSEP), the City of New Orleans has authorized evacuteer.org to manage all volunteers who work within the CAEP at 17 neighborhood pick-up points, at the Union Passenger Terminal for evacuee processing, and at City Hall to assist with 311 hotline operation.

Evacuteer.org provides programs that include continuity planning services, annual readiness drills and exercises, community preparedness and outreach events, pet evacuation handler training, and EvacuKids, a program that teaches students about the science behind hurricanes, cyclonic formation, and other naturally occurring phenomena. Using the scientific process, students develop hypotheses that encourage a greater sense of understanding and further exploration. Curiosity of the natural world is reinforced through the promotion of critical thinking and reasoning skills. Evacuation routes are important map features and EvacuKids are challenged to engage in spatial reasoning to locate the Louisiana coastline, Mississippi River, the City of New Orleans, their neighborhood, and their nearest EvacuSpot. This learned preparedness expertise empowers children and youth to act before and during storms and fosters self-sufficient, informed citizens who contribute to creating a sustainable, safer community.

EvacuSpots was proposed to meet the needs and concerns of New Orleans residents. EvacuSpots is a replicable solution to a critical weakness in the city's safety; the small, inconspicuous size of the signs marking the 17 evacuation pick-up points were identified as a crucial barrier to citizen awareness of and participation in the CAE (below left). The City's 17 evacuation points will now be clearly and consistently marked by identical 14-foot sculptures—EvacuSpots (below right). The 17 pick-up points are located in easily accessible areas for residents to report in the event of an evacuation. There are also four sites specially equipped for senior citizens.[6]

F.   Georgia

Georgia Department of Transportation Lane reversal (contraflow)
Georgia Department of Transportation (GDOT) has delineated evacuation routes to facilitate the evacuation of the threatened population within Georgia as well as bordering states. GDOT has developed lane reversal (contraflow) plans for three major interstates (I-16, I-75, and I-95) to enhance the State's capability to facilitate a major evacuation effort.

The lane reversal (contraflow) plan for I-16 converts all lanes to west-bound traffic. Lane reversal (contraflow) operations are initiated at the eastern end of the interstate in Chatham County via use of two median crossovers. All westbound exit ramps remain open and select eastbound lane on-ramps are opened to allow evacuees to exit.

I-75 is capable of supporting lane reversal (contraflow) operations from Lowndes County at the Florida border to Dooly County in central Georgia, a distance of about 102 miles. All northbound ramps remain open and select southbound on-ramps will be opened to allow evacuees to exit.

I-95 is capable of supporting lane reversal (contraflow) operations from Camden County at the Florida border to Bryan County which lies southwest of Savannah. All northbound ramps remain open and select southbound on-ramps will be opened to allow evacuees to exit.

Georgia Evacuation and Re-Entry
The Evacuation and Re-entry Branch (ERB) is a branch of the Operations Section within the state's Incident Command structure. The ERB provides the State Operations Center (SOC) with enhanced coordination capabilities during coastal evacuations (from within Georgia

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[6] Retrieved on August 8, 2014 from evacuteer.org

or from neighboring states, depending on the hurricane threat) and has oversight of initial post-landfall re-entry operations.

The ERB is comprised of a working group of liaisons from evacuation and re-entry operations stakeholders. ERB stakeholders include Georgia Department of Transportation, Georgia Emergency Management Agency, Georgia Department of Natural Resources, Georgia Department of Public Safety (DPS) – Georgia State Patrol , DPS – Motor Carrier Compliance Division, Georgia Department of Defense, Georgia Power, Georgia Transmission Corporation, Georgia Public Service Commission, Georgia Forestry Commission, Georgia Electric Membership Corporation, and Amateur Radio Emergency Services.

The ERB enhances coordination capabilities for the SOC in two areas of response: coastal evacuations and post-landfall initial re-entry. During evacuations, the ERB addresses evacuation-related Requests for Assistance from coastal and inland counties, coordinates lane reversal (contraflow) operations for I-16 and/or I-95, oversees aerial and ground-based reconnaissance, and coordinates the deployment of Highway Emergency Response Operator (known as "HERO") vehicles to I-16 and/or I-95. During the post-landfall initial re-entry, the ERB coordinates debris clearing missions along pre-designated re-entry routes into impacted areas, supports communications for re-entry task forces, and supports communications between coastal and inland emergency management agencies and the SOC.

Georgia Re-Entry Planning

The response actions undertaken during the hours immediately following a tropical cyclone are critical for minimizing loss of life and beginning the recovery process. Georgia uses a phased approach to re-entry.

In Phase 1, re-entry task forces, comprised of state and local response agencies as well as utility providers, enter the impacted area and contain life-threatening hazards.

In Phase 2A, once hazards have been contained, life safety operations commence; these include search and rescue, emergency medical services, fire suppression, hazardous material control, preliminary damage assessment, and essential relief staff and immediate utility restoration to critical medical facilities.

Phase 2B allows the entrance of those from the public and private sector to support the re-establishment of critical infrastructure systems; these include petroleum and food distributors, non-emergency medical facilities (such as dialysis centers), pharmaceutical providers, members of the media, medical facility support staff, and local government essential workers.

In Phase 3, citizens who reside in the impacted area or own property or a business in the impacted area are allowed to re-enter.

Phase 4 allows the general public to access all or portions of the impacted area, as determined by local officials. Access may be restricted to daylight hours as the recovery process continues.

Georgia employs the use of critical workforce disaster re-entry permits during Phase 1 of re-entry. These permits are designed to allow Critical Infrastructure Owners and Operators (CI/OO) and their contractors, subcontractors, and assignees to gain access to impacted infrastructure and begin the recovery process. In general, CI/OO who present a company-issued photo identification and arrive in a marked company vehicle will be given access to the impacted area. The permits are designed primarily for CI/OO contractors, subcontractors, and assignees who may arrive in unmarked or unfamiliar vehicles; these individuals must also present verifying employer-issued photo identification to enter the impacted area.[7]

Chatham County Evacuation Planning

Chatham County has a Command Policy Group made up of local elected officials, including mayors from each municipality and the Chairman of the County Commission, who make the decision regarding evacuation orders based on recommendations made by the Chatham Emergency Management Agency. Preliminary discussions are conducted 72 hours prior to the event, during which evacuation coordination of specialty and long-term care facilities are discussed. These facilities include nursing homes, assisted living communities, hospitals, behavioral health centers, and prisons. Facilities such as hospitals, prisons, and behavioral health centers will be evacuated to similar pre-identified facilities, which are well within a safer area. Each nursing home and assisted living community has its own mutual aid agreements and evacuation contracts (mandated by law) with another facility in a more inland location to temporarily house these populations. The timeline for evacuation for these facilities is by the 48-hour mark. Simultaneous with evacuations of the specialty and long-term care facilities, those with functional and access needs are evacuated to locations that can meet their needs, such as hospitals, other healthcare facilities, shelters that have medical needs capabilities, or simply a congregate care shelter managed by the Red Cross. The rest of the population, or "general population," is ordered to evacuate starting at the 36-hour mark.

Chatham County Transportation Plan for Citizens Needing Assistance

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[7] www.gema.ga.gov/content/atts/prepare/Plans%20and%20Maps/Plan%20Library/2010%20GEOP%20IA-A%20Hurricane%20CONPLAN.pdf

Chatham County provides transportation to those with access and functional needs. These individuals are picked up directly from their homes and dropped off at locations that can meet their individual needs. If some individuals must be transported outside of the county, they are dropped off at the pre-identified Evacuation Assembly Area (staging area) to be picked up and transported by buses provided by the state.

Chatham County also has a special transportation plan for anyone who does not have a mode of transportation or does not have any alternate accommodations during the evacuation order. County transit buses follow a pre-determined route, picking up residents at specific pre-identified collection points throughout the county. The residents then get dropped off at the Evacuation Assembly Area, after which they are then placed on the state's Board of Education buses to be transported to Augusta, GA. Chatham County has sheltering agreements with the city, which has the capacity to shelter up to 5,000 people. The shelters in Augusta are managed by The American Red Cross, who has shelter agreements in place with the state.

One major success regarding transportation is the state's program to provide supplemental transportation to long-term care facilities (nursing homes, assisted living communities). As stated previously, these facilities are required by law to have an evacuation plan in place and have contracts with service providers (i.e. transportation) for evacuation. An additional requirement, which is relatively new and was implemented within the past two years, is for each long-term care facility to provide a copy of its emergency plans to the county and the state. This allows the state and county to pre-determine any potential conflicts that may occur at the time of the event (i.e. multiple facilities with contracts with the same service provider). In a situation that a facility's transportation arrangements fail, the state can provide transportation for the facility's population.

Chatham County Traffic Management Plan
Evacuating specialty care and access/functional needs populations prior to issuing evacuation orders to the general public has really helped in alleviating the traffic issues, such as congestion and back-up, that arise during an evacuation. In addition, there are specific traffic control points and evacuation routes identified, which also make the process more streamlined.

The lane reversal (contraflow) plan generally is not activated until the storm will be a Category 3 or greater. Within Chatham County, specifically, there are two crossover lanes, which allows all westbound traffic to crossover into the eastbound lanes. These crossover lanes further allow those within downtown Savannah (Chatham County's most populated municipality) to assimilate into the eastbound lanes.

Chatham County knows that in can rely on the state for resources. They understand the burden of safely evacuating a large population in a specific time period, and they have a good gauge on when to send requests for assistance (RFAs) to the state, who provides assistance with aspects of evacuation, such as traffic management.

Once the storm has passed and it is safe to return, the same resources used for evacuation are used for re-entry.[8]

Tybee Island Public Information

As part of a continued effort to educate the public on storm surge impacts to one of Georgia's most vulnerable barrier islands, the City of Tybee Island placed surge indicator markers in high profile areas of the island. One such marker is located directly outside the City Hall building and others are placed at the entrances to beach parking lots. These markers show potential surge for each storm category so that visitors and residents can get a clear visual depiction of potential inundation and internalize their risk of remaining on the island during storm events.

G.   Pennsylvania

Commonwealth of Pennsylvania Sheltering

Several neighboring states such as Pennsylvania and Maryland are working cooperatively to address their issues with state managed shelters. Pennsylvania adopted the state managed shelter concept over the last year and continues to refine the program. They activate their state managed shelter system under the following conditions:

- At the request of the county
- Under the direction of the Governor
- Response to an EMAC request

Pennsylvania has adopted a different concept for the shelter operation. They utilize an Incident Management Team for the Command and Control functions and through a cooperative agreement with the American Red Cross, they provide the staffing and

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[8] Source: Interview with Dennis Jones, Deputy Director of Chatham Emergency Management Agency

registration team for the shelter. This was tested in February 2014 with a live incident and average cost per day was approximately $22,000 per day. They are currently working on refining this to reduce costs further. Their program is a cooperative program with the Pennsylvania Emergency Management Agency and the Department of Public Welfare. The two agencies work together to address all aspects of sheltering at the state level. Sheltering at the local level is coordinated at the local level with the American Red Cross. The State Emergency Operations Center maintains a resource inventory at the local and state level for shelters and the American Red Cross Emergency Preparedness Liaison Officer staffs the EOC during all activations to assist with situational awareness and unmet needs.[9]

H.   New Jersey

State of New Jersey Evacuation Planning
The State of New Jersey, including many of its cities and townships, has recently implemented certain measures to protect its citizens from and mitigate against hazards, as a result of Hurricane Sandy in 2012. The State of New Jersey Department of Community Affairs has identified several resiliency projects to improve the state's infrastructure, which will result in a more effective evacuation during times when it is ordered. One example of improving the infrastructure is the construction of a new bridge parallel to State Route 72, which will provide a redundant route on or off Long Beach Island in the event a span of State Route 72 needs to be closed. Other types of improvements include improved drainage systems, pump stations, and a 24-inch thick pavement and sub-base materials on roadways used as evacuation routes.

New Jersey conducted a state-wide drill in July 2014 to test its lane reversal (contraflow) plan in the event of an evacuation. Work crews carried laminated maps of where cones and barriers needed to be placed to set up the coastal evacuation routes for lane reversal (contraflow). Communications among emergency personnel as well as public notification was also tested and evaluated, as it related to evacuation and lane reversal (contraflow) procedures. The exercise was deemed a success, and it will be evaluated in the coming weeks to improve the state's lane reversal (contraflow) plan, as necessary.

Another resiliency project identified by the Department of Community Affairs, the Retail Fuel Station Energy Resiliency Program, targets retail fuel stations within one-quarter of a mile of identified evacuation routes in the state and incentivizes the permanent installation of a back-up electric generator or "quick connect" capability. In addition, the state is partnering with the U.S. Department of Homeland Security to explore opportunities to increase the resiliency of the state's petroleum storage, distribution, and supply systems.

[9] Source: Interview with Nicholas Buls and Devon Heberlig, Pennsylvania Emergency Management Agency

New Jersey Transit is currently working on its own resiliency project. They are working with U.S. Department of Energy and Sandia National Laboratories to develop "NJ Transit Grid" – a first-of-its-kind micro-grid, which is capable of providing highly reliable, resilient power to NJ Transit's critical infrastructure and systems. NJ Transit is also collaborating with Stevens Institute of Technology to develop real-time, site-specific, "micro-surge" modeling technology for use during significant weather events to enable potential prediction and modeling of storm surge.

The New Jersey League of Municipalities educational foundation is currently conducting research on how to provide medical assistance, evacuation, and shelter services to special populations such as children, pets, disabled, and functional/access needs.

City of Summit Shelter Planning
The City of Summit (Union County) has taken measures to increase resiliency against emergencies and disasters. The city has identified multiple potential sites throughout the community to serve as sheltering stations for particular populations (government, private, church). In addition, the city has identified and partnered with animal organizations that will act as sheltering stations for pets. The resource and materials list has been updated to include bus drivers and buses available for use in special transportation circumstances and for evacuation. Generators have been installed to ensure power for traffic signals, and the Public Works Department has worked directly with the energy supplier to create a system that de-energizes downed power lines to speed opening of blocked roadways.

I.   North Carolina

In North Carolina, evacuation decisions rests largely on the locals. The state assists as needed, monitors the progress, and addresses issues as required. The Governor has the authority to order an evacuation, but the locals may choose to issue their own order if the Governor has not done so. The North Carolina Emergency Management Regional Coordination Center-East (NCEM RCC-East) works closely with local jurisdictions to facilitate evacuations. RCCs may be established anywhere in the state based on the incident, but RCC-East is established typically due to severe storm incidents to assist coastal jurisdictions by providing resources, many times by providing equipment and personnel for traffic management and a safe evacuation. Through the RCCs, the state can also support and stage other disaster relief personnel and equipment (i.e. debris clearance teams, public works strike teams) to support affected jurisdictions.[10]

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[10] Source: https://www.nccrimecontrol.org/div/em/.../EOCSOGVersion4.doc

One way that the State has to assist in evacuations is through the state-wide bus contract, which is part of mutual aid agreements between the state and each individual jurisdiction. This resource is available at a jurisdiction's request – commercial busses are made available via private contracts while medical busses, ambulances, school busses, and NCDOT transportation assets are resourced via the Statewide Mutual Aid Agreement. The state previously had an I-40 Lane Reversal Plan, which was initially developed to create a more efficient way for the travelers to evacuate from the New Hanover County coastal region. New Hanover County lies at the southeastern most tip of the North Carolina coast, providing only two main evacuation routes heading north or west, with I-40 being the major thoroughfare. The Lane Reversal Plan was decommissioned in 2013, largely due to the lack of resources available to execute the plan in a timely manner. Resources to support the operation would have to be deployed from all across the state to support the operation. In addition, the State determined these resources are better utilized in other, more critical, aspects of emergency response during a hurricane. There has not been any discussion about improving the decommissioned lane reversal plan or developing another lane reversal plan for the state.[11]

There are several concerns regarding evacuation in Currituck and Dare Counties, an area where multitudes of vacationers go each year to visit the Outer Banks. The most prominent concern is that the time (in hours) it takes to fully evacuate residents and visitors from the Outer Banks to a safe inland location can range anywhere between 15-23 hours during peak season. The state-designated standard is 18 hours. There are only two two-lane roads that serve as evacuation routes from this area, and the potential traffic volume causes a series of issues regarding evacuation.

The Mid-Currituck Bridge project, currently under proposal, calls for transportation improvements in the Currituck Sound area, which can assist in alleviating traffic congestion on the main routes into/out of the Outer Banks area. Some of these improvements include: widening roads, adding median acceleration lanes, and replacing some identified traffic signals with roundabouts (traffic circles).

The proposed Mid-Currituck Bridge project is North Carolina's first venture into public-private partnerships (PPP) for major transportation infrastructure. These partnerships can be an effective way to deliver much-needed infrastructure while minimizing costs and risks to the public. Broadly, PPP refers to arrangements, typically medium to long-term, between the public and private sectors whereby some of the services that fall under the responsibilities of the public sector are provided by the private sector, with clear

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[11] Source: Interview with Joe Wright, Deputy Director of Division of Emergency Management at North Carolina Department of Public Safety

agreement on shared objectives for delivery of public infrastructure.   A PPP is different from public contracts (such as concessions) in that a PPP allows a private party to deliver a service to a public party for a fee rather than providing a service directly to the public and taking end user risk. A PPP allows the state to capture the advantages of private sector participation while maintaining accountability to develop new infrastructure.[12]

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[12] Source: http://www.ncdot.gov/projects/midcurrituckbridge/

RECOMMENDATIONS

The findings below have been compiled based on reviews of Commonwealth, regional, and local plans; interviews with emergency management and public safety stakeholders at Commonwealth and local levels; and a validation exercise, which included participants from Commonwealth and local agencies, emergency management departments, transportation departments, and healthcare services. Based on these findings, recommendations for hurricane program improvement have been developed for the Commonwealth of Virginia and the Hampton Roads region.

I.   Public Information

Finding: There is some resistance by local emergency managers to support multi-level (local, regional, and Commonwealth) public information and education messaging. Research and interviews revealed that localities provided mixed preparedness messages or completely omitted preparedness messages. Such inconsistencies lead to confusion when the community at-large is expected to respond or act in a certain way.

Recommendation: Communicating preparedness, mitigation, evacuation, and sheltering information during non-disaster times needs to be improved to educate individuals about the best ways to protect their families and properties from loss. For preparedness and emergency public information to be effective, individuals must receive the message, acknowledge the message, internalize the message, and then act upon the message. Local jurisdictions should adopt or adapt the Virginia Hurricane Guide as a primary source of preparedness information to ensure consistent messaging.

Dedicating staff members to focus on improving community outreach, (i.e. creating partnerships with community members and organizations and providing emergency preparedness education to the general public) will improve public support of the emergency management programs and will help individuals become better prepared to respond accordingly to emergency notifications.

Finding: ReadyVA is a web-based resource for emergency preparedness and information. Based on interviews and focus group findings, not many residents know about the resource.

Recommendation: ReadyVA is a great resource before, during, and after an incident to keep citizens informed, but only a small population is aware of it. The *ReadyVA* smartphone application and website should be locally marketed through public service

announcements and, outreach efforts, and advertising programs to the communities in the region on a regular, recurring schedule, for example, by promoting the resources via social media. Additional timely information related to impending emergencies is often made available through the *ReadyVA* homepage. Such information can also be disseminated through social media outlets with a crosslink that states "for more information, visit ReadyVA".

Finding: The Hampton Roads area has a high tourist population, which is not specifically addressed in emergency public information planning.

Recommendation: There is still a gap in how to approach preparedness for the transitory tourist population. Local businesses and community leaders expressed concern about the potential negative economic impact associated with evacuating tourists. It is important for tourists to understand the preparedness and response measures they can take to be more in control of their environment. Tourist education programs may include public service announcements on closed-circuit hotel television channels. Preparedness and evacuation literature in "welcome packets", and other print or mass media options. Additionally, smartphone applications such as *ReadyVA* should be advertised and encouraged in the tourism market.

Local emergency managers can create partnerships with groups such as the Visitor's Bureau or Hotel/Motel Associations, who have easier access to tourists and who can provide preparedness and response information. They should also ensure "Hurricane Evacuation Guides" are up-to-date and contain pertinent and timely information and include *ReadyVA* information. Localities can also develop their own outreach efforts, including informational pamphlets specific to their jurisdictions.

Finding: Coordinated, de-conflicted, and consistent public messaging from jurisdictions within the region, as well as from the Commonwealth, has been a challenge.

Recommendation: The lack of regionally coordinated public messaging has led to confusion among local jurisdictions. Programs like *ReadyVA* can be used as the model for all local public education. Localizing the Commonwealth's preparedness program keeps the message consistent, but adds relevant information of local importance.

Finding: Ready Hampton Roads (*ReadyHR*) website provides the basic information on emergency preparedness but does not provide detailed public preparedness messages or serve as primary source for up-to-the-minute, vetted emergency information for the region.

Recommendation: Dead links to "more information" should be repaired, or more information should be provided on the main *ReadyHR* Residents page. Local jurisdictions

that do not wish to direct people to *ReadyHR* should consider adapting the messaging from *ReadyHR* and *ReadyVA* and creating their own program that provides consistent messaging with the Region and the Commonwealth.

Driving residents to these regularly maintained sites before a disaster occurs creates a habit and ensures that people will turn to local officials during emergency events, which in turn reduces the risk of following sources with rumors, misinformation, or disinformation.

It is important to become the trusted source of information for residents. Specific educational opportunities to improve life safety should include the following concepts:

- Develop a personal evacuation/sheltering plan that includes a place to go when home is no longer your safe place. The plan should include a route to get there using identified evacuation routes and consideration for possible road/bridge/tunnel closures. Residents and visitors should not plan to rely on public shelters unless they have no other means of evacuation and sheltering. Maintain a rainy day fund that includes enough available funds for hotel lodging, fuel for your vehicle(s), meals, and pet lodging as necessary.
- When is sheltering-in-place a viable option? Can you stay in your home during a storm? The program should include recommendations for wind-rating inspections and certificates. Usually the cost of the inspection is returned in reduced insurance premiums. What is the flood potential for your home and what to the benefits/risks to staying during potential minor flooding?
- How does the local jurisdiction identify who needs to evacuate. Are you in a surge zone and which one? Are you in an evacuation zone and which one? What does that mean specifically to me?
- Provide specific details regarding what's in a hurricane kit and how that kit should be updated, food stocks and batteries rotated, and include recommendations for items such as first aid kits, tarps and tape to cover broken windows, bug repellant, battery operated or hand fans for cooling, cell phone recharging packs, etc.
- Provide examples or samples of a family emergency plan so that residents know what should be included in their own plan.
- Provide easy access and regular notification on where to sign up for messaging. Sign up links should be on the home page of all local government websites. Campaigns to encourage sign up should be ongoing through blue-sky operations and rainy day events.

Finding: As communities continue to rely on social and other online media as sources for information, the Commonwealth and local leaders need to take the lead in providing important messaging through these common channels. The *ReadyHR* Facebook page has 387 followers and the VDEM Facebook page has 22,523 followers. A 2011 study shows

that there are 3,574,060 Facebook users in the Commonwealth, providing a potential 44.9% penetration rate[13]. Additionally, *ReadyHR*'s Twitter account hosts 118 followers and VDEM hosts 15,100 followers.

Recommendation: Consider campaigns to get more followers to social media, *Ready VA*, and *Ready HR*. Also consider weekly preparedness and planning messages that are topical, timely, and specific (i.e. what is in a hurricane kit, what evacuation zone are you in, do you know your evacuation routes, etc.) When hurricanes are threatening, public information messages should be issued in conjunction with updated situation reports from the national weather service and local/Commonwealth emergency managers (i.e., every 12, 6, and 3 hours, etc.).

Finding: Many local jurisdictions do not have the available staffing to manage public inquiries and public information during emergency activations.

Recommendation: If regional public information, such and *Ready HR*, is not viable or palatable, local governments must consider establishing EOC/JIC call centers and training volunteers or non-critical staff to work in these centers to manage public inquiries during emergencies. Local jurisdictions should also work with United Way 211 services to develop and manage inquiries Call centers should also be set-up to address social media and web-based inquiries from local residents and visitors.

Finding: There is limited coordination between local Emergency Managers and Public Information Officers to develop and deliver emergency messages.

Recommendation: Local Emergency Managers and Public Information Officers should identify and assign liaisons to work directly with both camps to establish and maintain public communication and consistent messaging through established public information channels. Joint Information Systems and Joint Information Centers (JIC) help to ensure timely, consistent messaging, but EOC's must have an avenue to ensure communication flow. Embedding a JIC Liaison in the EOC reduces the communication gap when the EOC and JIC are not collocated.

Finding: Because of staffing limitations, some jurisdictions find it challenging to monitor information on the Internet.

Recommendation: There is little regulation on what can be posted to the internet. Most of the information in an emergency is posted by unvetted sources. It is imperative, especially during emergencies, that the information being circulated online by public safety agencies

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[13] Retrieved on August 8, 2014 from http://www.internetworldstats.com/unitedstates.htm#VA

is timely and accurate. The best way to minimize the impact of inaccurate information reaching the public is to be "ahead of the curve," and get proper information out through all media outlets, including social media sites, providing immediate, transparent, and continually updated information. In addition, monitoring websites, public blogs and posts, can provide insight into the public's perception, experiences, and needs during a hazard event.

II.   Information Sharing and Situational Awareness

Finding: There is little information sharing, especially between local jurisdictions and the Commonwealth, which makes it difficult for the state to know the resources and assistance the localities need. Many local jurisdictions do not have the staff or means to post timely situation reports to information sharing services.

Recommendation: The Commonwealth should work with local jurisdictions to identify and promote a common operating picture that can be easily managed by the smallest reporting agencies. They should also develop and promote training or guidance that identifies the focus areas for information sharing and the time intervals for reporting. Through this training program, each participating jurisdiction should be educated to understand that information sharing through a common operating picture benefits all users.

VDEM should develop outreach efforts to localities, collaborating on resources or assistance each locality's needs during and emergency by letting them know exactly what resources and assistance the state can provide.

Finding: There is no standardized, common Incident Management System platform on which all agencies information can be entered and retrieved.

Recommendation: Although each jurisdiction has its own version of the Incident Management System, information flow is disconnected, since these versions are not linked together. Some local jurisdictions use the state-provided Incident Management System portal, while other maintain their own incident management system software licenses. Continuity and access to important situation boards, resource request boards, and related information sharing portals are often limited to the individual user agency and their supporting stakeholders. Fusion boards and identified trained, available support staff would improve communication flow and address this need.

VDEM should work with local jurisdictions to develop a situational awareness platform on which all agencies' information, including the Commonwealth's, can be entered and retrieved.

*NOTE: The Commonwealth is currently in the process of developing and testing a product called WebFusion; the Commonwealth's version of a situational awareness platform.

Finding: The Commonwealth's Incident Management System is an under-utilized tool partly because of the way information is posted. There is too much detailed information going into the subject line, sometimes paragraphs long, which make it difficult to filter through and get the pertinent information that one needs.

Recommendation: Training on proper Incident Management System operations, and the employment of the system as a daily operational tool will help to ensure the tool is utilized properly during major events.

VDEM should provide training on the use of the situational awareness application. Users should only provide a "snapshot" of the most critical information in the subject line, with the option of expanding the message for further details.

Finding: There is no requirement for jurisdictions to enter information into the Incident Management System.

Recommendation: Hampton Roads region should work with local jurisdictions to prioritize information sharing. Each jurisdictions actions and needs impact the others. Information sharing leads to resource sharing and impact reduction during emergency events. Additionally, a lack of information sharing and situational awareness can lead to uninformed decision-making, at the local, region, and Commonwealth levels.

VDEM should work with local jurisdictions to develop standardized reporting procedures, and require jurisdictions to enter information into their situational awareness applications.

Finding: Staffing is one of the main issues with lack of data input into system at the local level. Some local agencies have limited staff and do not have the resources to properly utilize the incident management system.

Recommendation: If locals can provide, at a minimum, intermittent updates of situation reports and resource requests through the incident management system, the Commonwealth can initiate resource support through deployment of local or state IMT Situation Unit Leaders and additional necessary staff.

IMT personnel are an under-utilized resource in the region. They can be deployed to provide support in data input and resource requests through the situational awareness application.

VDEM should work to provide training to local personnel, as well as other support personnel, who may be designated to be responsible for data collection and input and resource requests.

Finding: The most effective decision-making occurs when there is up-to-date situational awareness and a robust common operating picture. Although conference calls and direct phone calls to other jurisdictions seems like a viable protocol, the process is too cumbersome in times when split-second decision-making is necessary. In addition, getting a representative from each locality on a call at the same time is very difficult when there are other more time-sensitive matters occurring. Multiple conference calls and phone calls to continually update each other within the region becomes an impediment to local-level response to an incident, but lack of information from surrounding jurisdictions can also hamper local-level response.

Recommendation: Implement a single situational awareness/common operating picture software platform, which can be shared cross-jurisdictionally and also allow access to the Commonwealth and any jurisdiction given authorized access.

Finding: Although the Hampton Roads area is the region that will be directly impacted by a hurricane event, surrounding areas are also greatly affected by decisions made to evacuate residents, resulting in a chain reaction of decisions in these outlying counties. The event does not stop at the outer edges of the Hampton Roads areas, especially when evacuations are ordered.

Recommendation: Identify and include other localities that may be impacted by evacuation and sheltering operations in the hurricane planning process. Ensure these outlying localities, especially west of the Hampton Roads area, are included in receiving situational awareness and the common operating picture that is developed.

Finding: The full capabilities of a situational awareness application are not fully understood by many local level program users. Situational awareness applications have historically been used only during major events spanning large geographic areas. Because of this, the tool is not used on a daily basis, reducing its capacity and proficiency of those who have training on it. In addition, regular maintenance of situational awareness applications are costly, making some question the real need to continue to keep it as a tool.

Recommendation: Situational awareness applications can be used as a daily operational tool, for even small-scale incidents. Once stakeholders understand the capabilities of this tool, there will be more "buy-in" and justification of the maintenance, especially if used on a daily basis.

Local users should integrate the situational awareness application as a daily operational tool. Provide in-depth training on the application on its capabilities, especially to stakeholders, and provide practical uses specific to each stakeholder's jurisdiction.

Finding: There is a limited pre-disaster baseline of available information and resources to use as a control for situational awareness.

Recommendation: VDEM and local jurisdictions should acquire some degree of baseline – pre-disaster information including identification of shelters in each jurisdiction and the capacity of each shelter. Baseline information is not only essential to understand what the environmental situation and dynamics were before the disaster occurred, but it is a vital requirement to help guide the early recovery process in terms of both rebuilding livelihoods and security as well as reestablishing and strengthening environmental integrity. When it is then possible (i.e. when more time and resources are available), the initial series of data gathering should be followed by a far more detailed overview of the situation, as a long term recommendation.

Key sources of baseline information are likely to include, but not be restricted to:

- Profile of the jurisdiction
- Satellite images and maps.
- Project reports from American Red Cross and Salvation Army
- Local knowledge on local jurisdiction's resources
- Previous related assessments

III. Sheltering

Finding: The Shelter Management function is assigned to the Virginia Department of Social Services, there is no assigned representative from VDEM to assist with coordination.

Recommendation: VDEM needs to assign a staff person to oversee the Shelter Program to work cooperatively with the Department of Social Services (DSS).

Finding: VDEM and DSS do not have a shelter equipment stockpile available to stand up their shelter operation, necessitating a just in time contract to purchase these items which causes a delay in standing up the shelter in conjunction with evacuation.

Recommendation: VDEM needs to explore opportunities for stockpiling the basic shelter commodities, such as cots, blankets, pillows, to reduce the time to activate and stand up a state managed shelter. The current time of 72 hours after the just in time contracts are put in place to order all supplies and equipment is not a realistic timeframe.

VDEM should consider planning objectives that work consecutively with sheltering and evacuation as the need for shelters is identified and localities prepare to evacuate.

VDEM should participate with the National Capital Region's Evacuation Exercise August 1-5, 2015. Pennsylvania and Maryland expressed the desire for VDEM to be a part of this exercise and multi-state initiative.

Finding: The Regional Catastrophic Planning Team developed a Shelter Inventory, Shelter Impact Assessment and a Geo-Coded Database of Shelters in the Region in 2011.

Recommendation: VDEM should utilize these planning documents as a baseline strategy for determining the current footprint in the Region for sheltering in cooperation and coordination with the local jurisdictions. The following elements should be examined to ensure that sheltering is coordinated with evacuation:

- Determining the estimated capability and capacity of the shelters and the personnel required to staff the shelters for the entire region.
- Redistribute the technical reports of the Regional Catastrophic Planning Team (RCPT) for use as a starting point in future assessments.
- Use the RCPT evacuation modelling and behavioral data as the basis for assessing the impacts of any potential changes to the Sheltering Plan.

Finding: Due to strict rules and regulations for sheltering, the local jurisdictions and the Commonwealth have only identified a few compliant local shelters.

Recommendation: Concerns and issues from local and Commonwealth officials include capacity of local shelters and liability if structural integrity fails. Most of the 8 to 10 identified local structures will house +/- 1,000 people. They do not have the means to house entire populations, but could support limited evacuations for the most common (lower category) storms.

Finding: Local leaders expressed concerns over sheltering liability, particularly if a shelter did not withstand storm-related winds.

Recommendation: Conduct research with established sheltering organizations (i.e. American Red Cross) to determine if there is any precedence for liability and litigation from structural failure during a sheltering operation.

Finding: Even if more local shelters are identified by VDEM and local jurisdictions, there is limited personnel to staff the shelters and limited available supplies.

Recommendation: Lack of staffing and supplies are two of the main issues relating to sheltering operations, both on the state and local levels. The state and localities must understand that just because they cannot provide staff and supplies from their own agencies does not mean staffing and supplies are lacking. There are plenty of resources such as local and national disaster relief organizations, local businesses, and local public entities. All of these may be able to support sheltering programs through defined public-private partnerships and a whole community planning approach. It is a matter of making it a point to reach out to these groups during the disaster planning process to identify what support they can provide during an emergency or disaster. In addition, other under-utilized resources are the Metropolitan Medical Strike Team and the Virginia Medical Disaster Assistance Team. The resources are available, but procedures must be defined on resource request, activation, and deployment of these two teams.

Finding: For the most likely and probably hurricane events to impact the Region, local sheltering is a more viable option than evacuation because it reduces the required evacuation times and reduces the amount of traffic caused by mass evacuations.

Recommendation: Standard industry best practices show that it is better to move people locally, keeping them within their communities, reducing long evacuation times and travel, and improving recovery times using the whole community approach to emergency management than to conduct large-scale evacuations. Other options, particularly for storms with anticipated significant impacts, include early identification of inland host shelters followed by communication of their location and access routes to the evacuating public.

Include in community outreach and public preparedness information the importance of identifying alternative accommodations (other family/friends residences, more inland hotels/motels) and how shelters should be last resort accommodations. Identify other local buildings that could serve as temporary shelters. Develop mutual-aid agreements with more inland jurisdictions, who will provide a sheltering location so as long as the requesting jurisdiction provides the personnel and supplies.

Finding: There is no whole community approach to emergency management.

Recommendation: There is little partnership, coordination, or collaboration with private partners and community groups/organizations to assist with emergency preparedness and response. Building partnerships will help identify available community resources that can be utilized in times of emergency.

Develop community outreach efforts to create lasting partnerships with businesses, groups, and organizations, which can all be invaluable tools locally during response and recovery efforts. Invite these partners to be directly involved in planning, as they can provide valuable insight, considering they live and work within the communities for which the plans are created.

IV. Evacuation

Finding: Although evacuation zones have been identified in the Hampton Roads region, localities still use storm surge for evacuation decision-making. Some localities are confused about which model they should use for evacuation planning and orders. In some cases, there are at least 43 evacuation zones identified for a given jurisdiction. The local leaders do not understand how the zones are divided, and are certain that residents do not know what zone they are in (or what it means to them).

Recommendation: Prior to an evacuation event, local's governments and the state must determine which evacuation model they will use, how it will be employed, and educate the community on its use. Discussion with local stakeholders indicates that there may be a lack of desire to introduce change in operational patterns, which have been in place for many years.

Provide training on the evacuation zones to local emergency managers and stakeholders, who should understand how these zones make it easier to provide evacuation orders to more specific parcels of land and not just broad geographical areas.

Finding: Whether using storm surge or evacuation zones, there needs to be a way for the community at-large to know and understand whether or not they are in an area that is under evacuation.

Recommendation: Simplifying the evacuation zones and the evacuation notification process, as well as educating the community on what it means to be in the evacuation zone will help evacuate the vulnerable population in a timely manner, rather than cause confusion or delay evacuations of given zones.

Develop a notification procedure that coincides with specific areas that are being evacuated. Enhance *ReadyVA* by incorporating the ability for an individual to enter an

address (and use geo-location through the smart phone application) to determine if he is within an area of evacuation or not. Share all evacuation orders and locations with the state.

Finding: Many tourist-heavy areas may not evacuate until last minute. This can cause heavy congestion on the roadways, stranded motorists, and added population that may need assistance. Tourism is the driving economic force in much of the region. Local businesses and leaders are reluctant to request evacuations at the risk of negative economic impacts.

Recommendation: Improving evacuation zones and related surge modeling will help reduce the number of people who may need to evacuate, and by using localized evacuation and sheltering programs, tourists can remain in the region and return to their planned vacations if the region does not suffer storm impacts.

Use evacuation zones, which are more geographically specific rather than having to evacuate a broadly defined area when unnecessary, to order evacuations.

Finding: Once evacuated, there are no clear and identifiable locations for citizens to go.

Recommendation: Localities may order an evacuation, but rarely do they have more direction on what to do or where to go, other than to "head west." The state and local jurisdictions must coordinate their evacuation plans with local and state-run sheltering plans to ensure evacuees can make a plan (and take action) in the event of an evacuation. Many local jurisdictions have identified limited local shelter capabilities. By developing and utilizing local sheltering programs, evacuees may only have to move a few minutes versus a few hours away to escape jeopardy in storm events. Providing opportunities for populations to remain in the local area and return to their daily lives much faster reduces recovery time and improves restoration of economic drivers.

Finding: There are gaps between the local access plan, the regional evacuation plan, and the sheltering plan as it relates to transportation access.

Recommendation: While the interstate highways are critical to the success of a wide scale evacuation, it is extremely important to recognize that evacuees will continue to clog the roads until they reach a destination, whether that is a shelter or a friend/relative's house. All of the evacuees' destinations will be located on roadways other than these freeways. The transportation plans must include some understanding of how the evacuees will complete their journeys, especially since local assets may be preoccupied with local issues, and not the regional evacuation. The Commonwealth's resources will be focused on the lane reversal and the interstate highways, relying on local jurisdictions to manage the local

access to and from the evacuation routes. This seemingly innocuous issue can have a dramatic effect on the evacuation as evacuees try to access shelters and services (fuel, food, rest rooms, lodging) using local roadways. Local traffic tie-ups can quickly begin to spill back onto the interstate roadways, choking the capacity from those critical evacuation thoroughfares. The evacuation and sheltering plans need to address this linkage.

Exercise this current plan with several scenarios to determine the best method to handle this possibility. Expand planning to include the local access component in the evacuation plan. This needs to be developed in consultation with any entity effected by the evacuation plan (i.e. local agencies). Plans need to be reviewed to identify where linkages occur. Once those linkages are identified, they need to be addressed in each portion of the plan.

Finding: It is unclear if the current evacuation timeline is reasonable for timely execution of evacuation. There is a very short timeline in responding to the threat of hurricane landfall in this area. With little room for error, key decisions must be made promptly to keep successive decisions and actions on time. The success of the evacuation is directly related to the time allowed for evacuation, the capacities of the transportation system, and the destination of the evacuees. While timelines have been established to effectuate a successful evacuation, transportation accidents, evacuees leaving late in the timeline, or changes in storm path could all negatively affect the success of the current plan.

Recommendation: In a scenario that a significant number of evacuees cannot complete their journey prior to storm onset, a plan should be developed to demobilize the lane reversal plan with a consideration of what to do with these people not yet at their intended destination. This may require sheltering those persons somewhere near the evacuation routes, and a plan for communicating that information to evacuees is just as important as deciding where it is located. Operational issues may impact certain key evacuation milestones. Delays in mustering staff and resources for mobilizations are critical to the success of the plan. Since some of the required staff and resources for the lane reversal will be coming from other areas of the Commonwealth, time to notify and transport staff may take longer than expected, especially if this event occurs during a holiday or weekend. Further, with no prior experience in executing the Lane Reversal Plan, it is difficult to determine if mobilization and demobilization timelines are reasonable.

Continually impress decision makers with the importance of making timely decisions to keep the plan on track. Continually explore best practices to decrease or better manage evacuation demand and to improve or to reduce timelines. Verify lane reversal mobilization and demobilization time lines are reasonable through exercises (tabletop, functional, or full scale). These exercises should pay particular attention to mustering the necessary staff and equipment, and the processes and steps needed to safely implement the lane reversal, and the processes and steps needed to safely return the roadways to normal

operations prior to onset of tropical force winds. If warranted, adjust timelines and modify plans to reflect any modifications.

Finding: There is no detail in the plan concerning re-entry and how this process starts. Issues such as power delivery, infrastructure damage, and debris preventing roadways and/or areas to reopen need to be addressed before re-entry is considered and permitted.

Recommendation: Commonwealth and local jurisdictions need to coordinate with the lifting of the evacuation order. When the evacuation order is lifted, certain areas may need to remain closed until inspections are complete and/or infrastructure repaired or debris removed. With any incident people are curious and the criminal element will also take advantage of the situation. The safety and security of the buildings within the evacuation area is vital to the success of the evacuation and needs to be addressed in the re-entry plan. Items such as security, times of re-entry, identification of those permitted to re-entry, who determines it safe to re-enter and others are vital to a safe effective and efficient Re-Entry Plan.

Develop a Re-entry Plan for the Hampton Roads area. Include local jurisdictions and utility providers (i.e. power, water, gas, wastewater providers). Incorporating the private sector into this plan is vital to the success of the Re-entry Plan.

Finding: North Carolina/Outer Banks evacuations have a significant impact on the Hampton Roads area. Virginia and North Carolina have a procedure to limit Outer Banks evacuees from travelling through the Hampton Roads area based on trigger values. North Carolina jurisdictions will typically start their evacuation ahead of the evacuation order trigger for Virginia, thereby sending evacuees onto the evacuation routes in Virginia prior to any lane reversal order or evacuation order given by Virginia.

Recommendation: Continue planning with and closely coordinating with NC Emergency Management and Traffic Operations both during hurricane planning and hurricane operations.

Finding: Wind closure protocols for several roadways may impact evacuation operations. Several transportation facilities have existing policies which require the facility to be restricted or closed during high winds. Most of these thresholds are in the 35 mph to 45 mph range, which would likely be occurring at the end of the lane reversal demobilization or just prior to the demobilization. This will exacerbate the situation for the last minute evacuees or those stuck in traffic during the demobilization. It may also restrict access to the lane reversal as several of the facilities are access points to the lane reversal and therefore adding to the local highway systems issues.

Recommendation: Ensure that roadways that are likely to close due to high wind policies are factored into the lane reversal demobilization plan. Work with local jurisdictions to incorporate the closures into their local evacuation plans and sheltering plans.

V.   Citizens Needing Assistance

Finding: At the local level, planning has included Access and Functional Needs (AFN) populations.

Recommendation: Consideration needs to be given to adopting a statewide advisory committee combined of AFN population constituents and service providers to guide and support related planning and operations in coordination with the local and regional groups. Additional consideration must to given to meeting ADA requirements for planned (versus spontaneous) operations. Locals, regional, and Commonwealth stakeholders should work with ADA compliance offices to ensure the intent of the codes are met, and where reasonable accommodation can be utilized during emergency and exigent circumstances.

Finding: Commonwealth plans do not incorporate Access and Functional Needs (AFN) in the overall emergency response plans, nor do they incorporate general population needing other types of assistance such as those with language barriers and those without independent means of transportation.

Recommendation: AFN and other specific-need populations should be incorporated into the existing Commonwealth comprehensive emergency response plans and annexes and not under separate plans or annexes to address specific populations. Using the whole community approach, AFN, language barrier, and transportation-limited populations' needs should be considered as part of the comprehensive planning approach and be incorporated into the resource needs of the general population. By doing such, broader messages can be issued to the whole population, reducing confusion and directed special attention to specific communities.

VI.   Lane Reversal (contraflow)

Finding: Some emergency managers feel a more robust local sheltering plan will negate the need for the Lane Reversal Plan.

Recommendation: Changes to the sheltering plan could dramatically affect the demands placed on the transportation system by reducing an evacuee's trip length and duration. The feasibility of local sheltering is worthy of further exploration and analysis, especially if that results in minimizing the time window needed for the evacuation. If local sheltering is

viable, that impact needs to be re-analyzed in the evacuation modelling to quantify the impact to the evacuation plan. However, unpredictable components of a hurricane such as storm severity, storm speed, and timing (i.e. weekends or holidays) suggest that a Lane Reversal Plan remain in the emergency manager's toolbox even if analysis shows that other countermeasures appear to make it unneeded. Continue to incorporate the lane reversal (contraflow) plan as a tool in the emergency manager's toolbox and ensure it is updated regularly. Regularly exercise parts of the plan to ensure it can be an option, if necessary. Better identification and use of either evacuation zones or surge zones to determine and minimize the evacuation areas will reduce the vehicular traffic along identified routes.

STRATEGIC ISSUES

The key strategic issues are identified as long term planning efforts that will provide a direct vision and strategy to enhance the Commonwealth of Virginia's hurricane preparedness efforts. These planning issues are to assist region-wide leadership in directing efforts, accomplishing goals and identifying resource requirements. The following elements will address both long-term and short-term regional goals, while ensuring integration of goals with jurisdictional and regional agency partners.

Overall, hurricane planning and preparedness is prevalent at the local, regional and Commonwealth level but the extent to which key objectives are fully implemented varies. While some jurisdictions have shown considerable progress in implementing action areas, others have still to start on some. The varied speeds of implementation and levels of commitment can create conflict and confusing during preparedness and response operations.

Critical concerns about outcomes of the hurricane planning and preparedness activities were validated at the exercise on August 5, 2014, noting that key strategic issues including sheltering, evacuation, lane reversal (contraflow), and public information have not been addressed to the extent necessary to increase the performance during a disaster.

As all local, regional, and Commonwealth public safety agencies continue to implement many of the enhancements, they are also determining the feasibility of implementing the key strategic issues. Some of these issues require a long-term strategy to achieve the desired outcomes. The most advantageous approach to reaching the desired outcomes would be to utilize the working groups and develop one strategic planning group with a focus on hurricane planning and preparedness.

These strategic issues are identified as a tool for a defined course of action to achieve specific goals through the application of sound strategies so as to enhance hurricane preparedness and response. They allow for monitoring and assessment of overall performance, strengths, and weaknesses, and provide direction and a management plan for future performance goals. It is important to keep in mind that that these issues outline strategic objectives, each of which present financial considerations, and are different from a response plan, as they do not identify operational roles or command structures.

I. Sheltering

The immediate sheltering of disaster victims would likely be accomplished by state and local governments and non-governmental organizations even if federal assistance is involved. Under a disaster declaration this work can be eligible for federal reimbursement. Whether provided by the states or FEMA, the assistance immediately provided is generally referred to as "emergency shelter." This emergency help is provided under the Stafford Act's Section 403 that provides for "Essential Assistance."

This type of assistance can take the form of large emergency shelters (such as local gymnasiums or other facilities that can accommodate large numbers of disaster victims), emergency group sites (using clusters of manufactured housing), rental assistance, and other supporting services provided by state governments and reimbursed by FEMA.

Defining and Determining Shelter Demand
The shelter demand percentage for each jurisdiction's reflects the percentage of a county's population that is projected to seek public shelter. It is important to note that results obtained by a survey do not always correlate to actual behavior.
What people say they will do during a "blue sky" survey often differs from actual behavior, which is influenced by a number of factors. Strength of storm, time since most recent significant disaster, and previous experience (or lack of) with tropical weather are just a few factors that influence a person's decision to evacuate or seek shelter. Hence, shelter demand may fluctuate overtime.

Stakeholder Engagement
Engaging stakeholders through a consultation process has become a widely accepted practice in post-disaster needs assessments. A wide range of tools are available to guide this, but a certain degree of training is required in order to ensure that the principles and possible approaches of participatory-based appraisals are respected and used correctly. Initial consultations should be held by the core team with leaders from amongst the affected communities, as well as and local authorities to explain the purpose of the briefing, to record their views and opinions on the issues being discussed and to seek their approval and advice on how to proceed.

Additional meetings would be arranged with a broad representation of local stakeholders from within communities, NGOs active in the region, and others, at times and venues suitable to them. For this, the core team is likely to be split into smaller groups in order to be more time-efficient. Further meetings will also need to be arranged with local authorities as necessary and appropriate.

Long Term Recommendation

Updating or enhancing the current shelter strategy incorporates gap analyses for sheltering as well as incorporate recommendations regarding current shelters, capacity, key personnel and staffing plan models, and alternatives for additional sheltering options. The following methodology provides a comprehensive strategy to provide adequate shelter options to victims during a disaster.

The Sheltering Strategy will only be effective if the needs of the disaster victims are met. The first step is to meet with the Jurisdiction Points of Contacts as well as gather data from Stakeholder Groups or organizations that provide shelter services to the population. It is anticipated that the stakeholder groups to include the following:

- Department of Human Services
- Department of Health
- Transit and County Transit Agencies
- Board of Public Utilities, Energy Assistance Program
- Department of Military and Veteran Affairs
- Department of Labor and Workforce Development, Division of Vocational Rehabilitation Services
- Local and Regional Fire Departments and Emergency Medical Services
- Local and County Social Service Organizations
- American Red Cross
- The Salvation Army
- Special Needs Registry
- Advocacy groups for functional needs groups
- Local and County Senior Centers
- Local and County Housing Authorities
- Religious Organizations
- Home Care Association
- County Welfare Agencies

These stakeholder meetings will identify data that each organization collects in pre-planning relative to sheltering in times of a disaster. These stakeholders will also be able to identify existing emergency preparedness plans that may be in place for their existing clients.

Public shelters and supporting facilities must be strategically located statewide to ensure safe, effective, and efficient movement of disaster victims. The approach to accomplishing this task utilizes geospatial technology and collaborative input from experts and stakeholders in a series of work-steps that are designed to answer the following questions:

1. Where are the locations of all existing evacuation/mass care shelters?
2. Where are the locations of evacuation shelters?
3. Are the shelter locations able to accommodate access and functional needs and pets?
4. What are the criteria and processes for designation as a shelter?
5. What are the support mechanisms and resources currently in place to support the functional needs population during a disaster emergency?
6. What are the roles and responsibilities of: elected officials; appointed officials; emergency management professionals; medical professionals; and VOADs to support shelters during a disaster emergency, as well as in the implementation and execution of evacuation and sheltering plans?
7. If an event triggers an evacuation and said event requires shelters to be open, what is the most efficient process for documentation (accountability), evaluation, administration, referral/transport to another facility, if necessary, of individuals with functional needs?

Sheltering Enhancement Steps
1. Interviews/Work-Sessions to gather information that will be needed to shape the details of the enhancement strategy.
2. Geographical Information System (GIS) and identification of applicable critical infrastructure utilizing existing information provided by stakeholders or obtained through third party sources such as plot flood plains, evacuation routes, and the locations of key critical infrastructure (i.e., hospitals, existing special needs shelters, existing mass care shelters, nursing homes, long-term care facilities) to verify the locations of shelters and to identify additional sites that could potentially be utilized as a shelter.
3. Review the criteria and guidelines for selecting a shelter, activation and staffing of a shelter and back-up personnel and facilities in the event of a disaster.

    - Scale, type of shelter and duration of disaster
    - Number of shelters needed
    - Operating hours
    - Locations including set up of facility and utilities
    - Capacity for 24 hour operation
    - Parking and access
    - Potential staffing models

4. Evaluate the current number of required shelters based on the population and ensure that they are strategic locations for the shelters.

    - Access to transportation corridors

- Population estimates
- Volunteers

5. Post- Sheltering Accommodations

  - If the person cannot return home, short term or interim housing should be considered.

6. Develop an annotated outline of recommendations which will include an alternative sheltering solutions.

II.   Citizens Needing Assistance

Citizens needing assistance includes the Access and Functional Needs population, residents with language barriers, and individuals needing transportation. Those who have access and functional needs may have additional needs before, during, and after an incident in functional areas including but not limited to: maintaining independence, communication, transportation, supervision, and medical care. Individuals in need of additional response assistance may include those who have disabilities; who live in institutionalized settings; who are elderly; who are children; who are from diverse cultures; who have limited English proficiency or are non-English speaking; or who are transportation disadvantaged.

The Emergency Operations Plan should include more detail about how specific aspects of the response address access and functional needs. For example, there should be information about the multiple ways that the County/Region/Commonwealth communicates emergency information and includes specific information about accessibility and reaching people with access and functional needs. There should also be additional information on preparedness/outreach; transportation; sheltering; and voluntary registries.

Public Communication
It is critical to know and understand the demographics of the community to ensure that the messages are prepared to reach the appropriate target audiences. People often feel fear from those they feel disenfranchised. This is particularly critical when dealing with people with different cultural, physical, medical need and language barriers. It is extremely important to choose spokespeople who demonstrate the balance between communicating empathy and authority.

Messages should always include a summary as not all viewers or readers are knowledgeable at every moment. The messages/visuals must be clear, uncluttered, and properly labeled.

- It is important to have plans to record messages for use on a hotline.
- Are your personnel familiar with social media platforms including, Facebook, YouTube and Twitter?
- Have recorded messages prepared to telephone local media.

- Have translators readily available with pre-scripted messages.
- Use rapid notification systems or text-message alerts.
- Automated outward dialing services.
- Pictograms for non-speaking populations and hearing impaired
- Text telephone

Sheltering

When disasters happen, often times, evacuation and sheltering become realities. Disaster victims and communities rely on the local governments to provide safe and secure shelters, (i.e. schools, churches, office buildings and tents). Many of these shelters have not been accessible by the functional needs population. Persons with a wheelchair can get to the shelter but often times do not have accessibility to the entrance and bathroom facilities. Public shelters and supporting facilities must be strategically located statewide to ensure safe, effective, and efficient movement of disaster victims.

Transportation

Transportation and associated infrastructure to support evacuation at a local, regional and state level is complicated and more difficult with the addition of Access and Functional Needs population. It is important to evaluate the roadway infrastructure, capabilities and resources to support an evacuation. Utilization of vehicles for use during transportation operations may be drawn from local transportation authorities/departments, military transportation units, taxi companies, bus companies, paratransit services, and other sources but consideration needs to be focused on American with Disabilities Act to ensure the mechanisms designated as transport vehicles can accommodate the Access and Functional Needs Population.

III. Lane reversal (contraflow)

Hampton Roads is a very complex region to evacuate as there are a large number of residents and visitors that may need to be evacuated in anticipation of a hurricane. In addition, there is a significant number of evacuees from outside the area (i.e. North

Carolina Outer Banks) that are likely to evacuate through this area for the same event. The area's transportation facilities present challenges such as vehicle capacity limitations and physical location, due to bridges and tunnels. The current plan recognizes those challenges and suggests solutions and timelines to best address those limitations. It also recognizes the possibility that changes in storm path or speed may cause the proposed timeline to be inadequate. Several components such as the Lane Reversal Plan present challenges due to staffing and logistics. In itself, the Lane Reversal Plan is not a panacea to totally accommodate the demands of a hurricane evacuation. Instead it is just one tool in a toolbox of techniques to address the evacuation needs of this area.

There has been much analysis and thought given to the evacuation and the issues surrounding a hurricane evacuation. However, no evacuation has ever been executed. The plan, therefore, has never been tested in a real life situation or through a full scale exercise. As with any evacuation, the ultimate destination of the evacuee is the most important factor. The ability to evacuate people is based on the numbers of people to transport, whether they are sheltering nearby or far away, and the ability of the transportation system to handle the number of people moving from point A to point B. Whether the evacuee attempts to relocate to a friend or family member's house in a secure location or to utilize a public shelter close or far away will affect the flow of traffic on the transportation system. In 2011, the Regional Catastrophic Planning Team (RCPT) employed a consultant to model this flow and traffic resulting from an evacuation. This effort provides for an excellent framework for understanding the limitations of the transportation system in evacuating at-risk residents and visitors.

Real life situations present many opportunities for such a complex evacuation plan to be disrupted. Situations such as changes in storm path or speed or unpredictable accidents on the transportation system, indicate the plans must be robust and adaptable to accommodate any likely scenario. The Commonwealth has done a good job at identifying and addressing some of the capacity bottlenecks on the evacuation routes (i.e. I-64 widening). However, further consideration should be given to likely failure points and attempt to address them in a comprehensive and integrated manner. A likely situation would be that the transportation system cannot deliver all evacuees to their preferred destination prior to hurricane onset. There should be a plan in place to deal with those stranded evacuees still on the road at onset of the hurricane. Stranded evacuees can dramatically affect the ability to demobilize the lane reversal in the 6 hours allowed in the Plan timeline. If this group of evacuees cannot make it to their intended destination, they will need to be guided to an alternative safe location, accessible within the limited timeframe available. There appears to be a gap in the plans to address this possible situation. A change in shelter destination not only affects traffic, but needs to be communicated to the evacuee in mid-journey. This possibility underscores a need for the hurricane plan to be integrated so that each component (i.e. evacuation, sheltering, and communications) can react and respond as changes become necessary.

CONCLUSION

Implementation of this In Season Hurricane Review is based upon the systematic and collaborative approach by the local jurisdictions, Regions, VDEM and key stakeholders and leadership. Key takeaways include: communication, coordination and continued information sharing among all entities at the local, regional and state level.

Stakeholders should utilize the In-Season Hurricane Review as a work plan to ensure specific time frames for short and long term recommendations. This will provide a guided structure for expenditures and actionable items, as well as ensuring that efforts are not duplicated on local levels. Records of progress (performance matrix, page 45) should be utilized to establish the goal, objective and action steps for each of the key strategic issues.

Progress for each goal should be measured to ensure milestones are met and project management adjusts to compensate for changing needs, challenges, and successes. Measurement of performance may include either *quantitative* measurements (percent complete, number of items purchased, i.e.

Records of progress are essential for measuring success of stated projects, progress towards goals, and for identifying strengths and weaknesses in local or regional procedures for goal management.

Changes in governmental structures, priorities (local, Commonwealth and National), characteristics (demographics, development), and lessons learned during the year, and accomplishments need to be documented for inclusion in the performance matrix.

Communication is essential to managing concerns with the preparedness activities and sustaining planning efforts. Continued collaboration, coordination and communication provide the necessary components to successfully prepare and respond to disasters and emergency events within the Commonwealth. Whatever resources and personal are utilized, the Commonwealth has built the foundation for a comprehensive all hazard approach to planning.

PERFORMANCE MATRIX

Goal: Action Step:				Reporting Timeframe: Recorded by (name/agency): Date:			
Objective	Activities	Date	Task Completed	Date	Results	Date	Objective Completed (Y/N) (%)
Recommendations:							

WORKSHOP/EXERCISE SUMMARY

Overview

As a culmination to the in-season hurricane review, a discussion-based exercise was conducted on August 5, 2014 at the Virginia Modeling, Analysis, and Simulation Center in Suffolk. Stakeholders from jurisdictions within the Hampton Roads region, as well as Commonwealth personnel and other stakeholders from law enforcement, healthcare, and transportation participated. The purpose of the exercise was to validate current state, regional, and jurisdictional plans, identify gaps and weaknesses within these plans, and prioritize courses of action to improve hurricane planning.

List of Participants

Last Name	First Name	Last Name	First Name
Alley III	Robert	Eischen	Dawn
Anaya	Michelle	Foster	Jennifer
Applewhite	John	Gabriel	George
Archie	Kate	Ginnow	William
Baker	Stewart	Glazner	George
Berstein	Erica	Green	Constance
Brown	Curtis	Gustafson	Dean
Burket	Bill	Hale	Kate
Calkins	David	Hoering	Jared
Campbell	William	Hunter	Donald
Case	Robert	Hutcheson	David
Cestin	Ted	Irving	Mark
Chamberlin	Sharon	Jacobs	John
Chappell	Tricia	Judkins	Jim
Cheatham	Frank	King	Jack
Christoph	David	Lindsey	Travis
Clontz	Andrea	Long	David
Colantuono	Kathy	Lott	Matt
Cooling	Judy	Magnaye	Carla
Cox	Pablo	Mahone	Scott
Crawford	Brookie	Mauskapf	Bob
Dent	Pat	McAteer	Beth
Dillon	Emily	McKee	Jennifer
Eaton	Jason	McRay	Anna
Milicich	Mark		

Last Name	First Name	Last Name	First Name
Mongold	Susan	Sommer	Pete
Moore	C. Creig	Stanley	Matthew
Nelson	Michael	Sterling	Bruce
Oblinsky	Michelle	Stern	Jeff
Owens	Karen	Stevenson	Emily
Owens	Reggie	Sutton	Erin
Phillips	Meredith	Terry	Lenmuel
Pointer	Gwen	Totten	Steven
Prieto	Ruben	Twigg	Wallace
Redick	Jim	Waldroup	Tammy
Ricker	Robert	Walker	Hui-Shan
Rose	Oliver	Washington	Lauren
Ruch	Sara	Williams	Brett
Ruppert	Benjamin	Williamson	Frank
Sadler	John	Wills	Gene
Scrivani	John	Zollar	James
Snead	Patricia		

Participant Feedback

At the end of the exercise, participants filled out a feedback form to reiterate top strengths, areas of improvement, and action steps. In addition, participants rated exercise design and conduct.

Top Strengths
- There is agreement that coordination and collaboration needs to improve in the region
- There is a good understanding of current plans
- Issues and gaps were identified
- Discussion/"brainstorming" led to recommendations developed by participants
- Appeared that everyone who participated had a "commitment" to improving
- All stakeholders have aligned priorities
- Developed relationships among localities
- The tools and technology are already readily available

Areas of Improvement
- Evacuation
- Sheltering
- Public notification

- Community preparedness
- Communication/coordination between state and local agencies
- Situational awareness/ Common operating picture
- Re-entry plan
- Traffic management
- Institutions of Higher Education involvement (they are willing to be involved)
- Plan of action – need to have a consensus on next steps

Action Steps and Priorities

Corrective Action	Priority
Identify where additional funding can come from for resources needed by localities	High
Develop a comprehensive training and exercise program to address all the gaps and issues and make sure everyone knows their role during a regional event	High
Continue to meet and discuss	High
Develop Common message about evacuation	High
Improve overall public information on preparedness for all emergencies	High
Commonwealth/Regional communication plan – situational awareness	High
Ensure interoperability of communications – phones, radios, etc.	High
Develop a single software platform for situational awareness among all levels of the government	High
In-depth initial or refresher training on all tools and resources available	High
Regional coordination among jurisdictions	High
Develop inland host sheltering strategy	High
Hire state shelter coordinator	High
Address staffing issue regarding sheltering - Training for new shelter team personnel to increase staff	High
Commonwealth must be engaged and supportive of regional/local planning	High
Develop re-entry plan	High
Create small work groups to create action items/ task forces for each action item	High
Training on evacuation zones	High
Publicize state bus contract	High
Develop way to keep CERT/Citizen Corps operational (huge asset)	High
Considering procedures for mandatory v. voluntary evacuations	Medium
Engage more state employees for local resource	Medium
Conduct gap analyses of all in-region shelters	Medium

Harden shelters within localities / Enhance building codes	**Medium**
Identify more shelter locations within localities	**Medium**
Legal issues addressed as it relates to sheltering	**Medium**
Evacuation- develop plan and capability for Rte. 58/460 and I-64	**Unrated**
Widen I-64 to three lanes until exit 20	**Unrated**

Exercise Design and Conduct

N= 34

Assessment Factor	Strongly Disagree				Strongly Agree	Overall Rating
The exercise was well structured and organized.	1 (2)	2 (1)	3 (8)	4 (14)	5 (9)	**3.8**
The exercise scenario was plausible and realistic.	1 (0)	2 (3)	3 (7)	4 (17)	5 (7)	**3.8**
The multimedia presentation helped the participants understand and become engaged in the scenario.	1 (1)	2 (4)	3 (15)	4 (8)	5 (6)	**3.4**
The facilitator(s) were knowledgeable about the material, kept the exercise on target, and was sensitive to group dynamics.	1 (0)	2 (1)	3 (5)	4 (17)	5 (11)	**4.1**
Participation in the exercise was appropriate for someone in my position.	1 (0)	2 (0)	3 (4)	4 (15)	5 (15)	**4.3**
The participants included the right people in terms of level and mix of disciplines.	1 (0)	2 (0)	3 (4)	4 (16)	5 (14)	**4.3**

Other Feedback

- Decision makers, such as city managers and other executive officials, must be present at these discussions/exercises.
- Exercise was a great opportunity to share information among emergency management and Commonwealth stakeholders.
- Unclear if the agenda (prioritization exercise broken up by in-season review discussion) went as planned/best use of time.
- The scenario was unrealistic.

- Everyone needs to remove pride out of the equation and do what is best to leverage tools/resources regardless of who will get the credit for it.
- For future planning, exercises, etc. include Navy Emergency Management.
- Similar discussions on hurricane planning have been occurring for many years, but nothing has been resolved. It would be great to see progress after this.
- Localities need to come together as a unified entity – no one seems to want to let go of their jurisdiction – power struggle.
- Preparedness of the general public will help alleviate some of the burden of localities.
- Continue to include Region I in Hampton Roads regional planning.
- Include Region I in situational awareness/information sharing.

APPENDIX A: JURISDICTIONAL INTERVIEWS

Overview

As part of the in-season hurricane review, interviews were conducted with several jurisdictions within the Hampton Roads region. The focus of the interviews was to discuss the local-level perspective of hurricane planning on state, regional, and local levels. Jurisdictions were eager to highlight parts of each of their plans that work very well. They also discussed the major challenges each of their jurisdictions face, as well as major challenges within the Hampton Roads region.

Interview Questions

Hurricane Planning:

- What are your triggers for implementation of the plan?
- How do you address EOC staffing and potential staffing deficiencies by ESF partners during evacuations?
- Have you identified and implemented any best practices into your hurricane plan?

Evacuation:

- What are your triggers for implementing your evacuation plan?
- Who has the authority to initiate evacuation orders?
- Do you have (and utilize) identified evacuation zones?
- Do you used tiered evacuation orders (voluntary/mandatory)?
- Have you identified public-private or whole-community partnerships to assist with evacuation support? If so, what and how?
- Do you utilize point-to-point evacuation concepts/agreements with other communities?
- What support services do you utilize to evacuate individuals who cannot evacuate on their own? (Public or private bus services, school buses, volunteer/staff drivers, etc.). How is that coordinated?
- Do you have a local/regional hurricane evacuation guide publication that you provide to residents?
- How do you manage tourist evacuation?
- Have you identified and implemented any best practices into your evacuation plan?

Lane reversal (contraflow):

- Do you have a lane reversal (contraflow) program in you state/county/city?
- Who manages the lane reversal (contraflow) program?
- Who has the authority to initiate lane reversal (contraflow)?
- Who implements the traffic control measures to divert incoming traffic?
- Do you have alternative incoming travel corridors for responding/staging emergency/support services? If so, how are those conveyed to the resources? Do you use credentialing concepts to identify authorized vehicles?
- Have you recently conducted a lane reversal (contraflow) study? If so, were there any findings that you would consider as a model strategy or best practice for other communities?

Public Communication:

- What are your primary sources of pubic communication and what is your estimated reach?
- Do you use redundant means of communications?
- Have you implemented programs to reach residents/visitors who do not use conventional mass communications (radio, television, etc.)?
- What strengths and weaknesses have you identified in social media as a means of public communication?
- Do you have dedicated staff/resources to monitor social media at all times during hurricane activations?
- Do you have a state or local public address and warning program that reaches smartphone technology through opt-in/opt-out services?

Sheltering:

- Do you have pre-identified evacuation shelters, or do you work with the Red Cross (or other assistance organizations) to identify shelter sites?
- Do you have a program for local sheltering as an alternative to evacuation?
- Can your existing sheltering programs accommodate the estimated number of evacuees? If not, have you identified alternative resources for sheltering?
- Have you adopted a whole-community approach to sheltering with support from private sector, NGOs, community and house of worship groups?

Summary of the Interviews

Witt O'Brien's was contracted to provide strategic insight into the Commonwealth of Virginia's In Season Hurricane Review in the Hampton Roads region.

Through multiple interviews and a discussion-based exercise that was conducted in August, main areas of strengths and areas improvements were identified. In addition, common trends of these strengths and areas of improvements can been seen across the various localities.

Most, if not all, localities understand the importance of coordination and collaboration with the surrounding jurisdictions, and they possess a great awareness of each other's current plans and procedures. The Regional Catastrophic Planning Team (RCPT) allows for regular discussions among the localities, typically a time when gaps and weaknesses can be identified and validated. Interestingly enough, most localities mentioned that they could manage their own in a disaster situation, and the Emergency Manager/Coordinator has complete faith that they are completing the goals established in the planning process. This makes it easier for the Emergency Manager/Coordinator to focus on larger issues rather than logistical issues.

Communicating information to the public has been given higher priority within all of these communities as they understand how crucial a tool it can be. While many of these localities are still working to better utilize social media applications like Facebook and Twitter, they have been utilizing television, radio, and print media to relay messages prior to, during, and after a storm. Reverse 9-1-1 systems and other opt-in notification systems have been used for several years now, and each system is tailored for each locality.

Sheltering capabilities is a weaker aspect of most of the localities' plans. Despite this weakness, the localities make do with what they have. In fact, the more heavily-populated and developed localities, including Virginia Beach, Norfolk, and James City, have several shelters capable of attending to the needs of the community with a reasonable number of personnel to run each shelter location. Most of the issues with sheltering revolve around the lack of structures to withstand increased wind speeds and/or the capacity to hold occupants. A concern some have is the fact that newly-built schools are classified as being "green" and cannot be used due to the amount of glass and open spaces within the building. In addition, in-land host sheltering agreements have not yet been facilitated. It primarily should be on the locality to create such agreements, but the hope is to get some support from the state so more inland jurisdictions will understand the necessity of such shelters to assist the more coastal areas.

Almost all jurisdictions interviewed believed that lane reversal (contra flow) would not be performed adequately enough in an emergency situation to be declared a success. Many cited confusion and lack of practice as the largest issues, mainly because it cannot be expected that the population can correctly evacuate, in such a manner, without practicing or possessing prior knowledge of the proper ways to evacuate in that capacity. Additionally, it was expressed that the infrastructure itself would not be able to handle the additional travelers, especially during peak tourist season. It was also discussed that there is a need for re-entry plans after an event and better traffic management plans.

Many of the jurisdictions indicated the lack of planning to address the special needs populations within their respective community. Although some localities have already incorporated a specific section to emergency plans that addresses the special needs population, most other localities do not have any plans for these members of the community or the tourists that may be visiting. As a result, there could be an increased number of casualties due to the lack of preparation or accessibility to be properly protected in an emergency situation.

Other issues mentioned include the evacuation and storm surge zones that may be pre-identified within a community. There is concern that these zones because more confusion than is desirable, and they do not necessarily clearly explain when a resident should evacuate based on their location to or within that zone. For example, Virginia Beach has 43 identified evacuation zones. They are working to decrease this number, but as of now, it creates confusion among the residents about whether or not they are, in fact, in an area that needs to be evacuated now or can be evacuated later on.

Finally, there is always room for improvement in emergency planning. One important thing to note is that there is a desire for more executive officials to participate at planning meetings and exercises. This ensures that these decision-makers understand the real gaps, weaknesses, and issues so that they may make more of an educated decision based on these issues. Rather than having a power struggle between and among localities, each and every one of them needs to understand the importance of coming together to get through an incident, such as a hurricane, that affects not just one locality but all of them.