Resilience 2013

Survey & Report

Resilience 2013

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ACKNOWLEDGEMENTS

As the saying goes, "Success can be achieved by putting bright people into a room, and getting out of their way." It has been my honor and pleasure to do exactly that with this report. It is for their work that I am very grateful.

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This report, of course, would not be possible without the support of its underwriter, Booz Allen Hamilton. It is important to note that the underwriter also is an expert in the field of preparedness and response and has a vested interest in America remaining vibrant and strong.

Last, but certainly not least, thank you to more than 600 DomPrep readers, who each provided valuable feedback that led to the discovery of important insights.

A changing global threat environment, coupled with increasingly interdependent societies and aging infrastructures, is a dangerous combination that preparedness leaders must address. Once again, it is gratifying that DomPrep and the newly created Preparedness Leadership Council, International serve as a catalyst for this type of interaction as the community searches for solutions.

Martin D. Masiuk
Publisher of DomPrep

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FOREWORD

Over the past few decades, the United States has developed an increasingly complex relationship with both nature and technology. This relationship has created challenges for protecting the nation's communities, addressing terrorist threats, understanding certain risks, and applying resources to protect or mitigate against those risks. This complex environment will force every level of government to make hard choices about what to preserve, what to protect, and potentially what to let go.

Resiliency, for all its varied definitions, is at its core about understanding the value of what we have and what we wish to preserve and improve. Recent disasters such as Superstorm Sandy have shown how a dense urban/suburban environment, with significant and vulnerable public and private infrastructure, can be heavily damaged by a hurricane and how the effects can ripple not only across the affected region but across the nation. There has already been a climate of change in the thinking of many policymakers at the state and local level. These policymakers ask questions every day about what to rebuild and how to make it stronger – and whether or not to rebuild at all.

The survey outlined in this report is the second of a series that Booz Allen Hamilton has partnered on with *DomPrep Journal*. The survey drills down into policy challenges for federal programs and understanding impacts at the state and local levels, where the majority of the resilience effort is realized.

One of the things that we collectively need to understand is that the event that occurs does not create the pre-conditions or status of the community, the people, and the country. For instance, Hurricane Katrina did not invent low-income, high-density housing, childhood malnutrition, and educational problems. The same is true about the pre-conditions in the region hit by Sandy (density, population, at-risk infrastructure). An event like Sandy is exacerbated and by those conditions.

Actions to address national resilience require a unity of effort to affect change. This is difficult. There are horizontal issues related to other governmental and private sector entities that have either a stake or equity in the response. The goal is trying to bring those sectors together with an understanding that the best thing we can do is work together to solve the problem. It is a leadership challenge, it is a legal challenge, it is a policy challenge, and it is a resource challenge.

It is our hope that this report as well as others contribute to that unity of effort.

Admiral Thad Allen
Executive Vice President, Booz Allen Hamilton
Former Commandant, USCG

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SUMMARY

The destruction left in the wake of natural and manmade disasters is worsening, as evidenced by the disaster response and recovery efforts of Hurricane Sandy in the Northeastern United States and the 2013 wildfires and flooding in the Western United States. Well before those incidents, Federal Emergency Management Agency (FEMA) Administrator W. Craig Fugate recognized that the federal government response system was time consuming and burdensome. As a result, the national preparedness focus shifted to a "whole-community" approach. By being actively involved in all phases of the preparedness, response, recovery, and mitigation cycle, the whole community can play a role in assessing the needs of the community and creating a more resilient nation. The goal of resilience is to absorb and minimize the impacts of a disaster while maintaining or restoring essential functions as rapidly as possible. Resilient organizations are able to maintain adequate capabilities under duress to perform their essential functions and recover rapidly from disruptions.

In order to move the nation toward the goal of resilience, President Obama signed Presidential Policy Directive 8 (PPD-8), National Preparedness, on 30 March 2011.[1] This directive provides a roadmap by requiring development of a National Preparedness Goal, National Preparedness System, and annual National Preparedness Report, as well as other components such as the National Planning Framework, Federal Interagency Operational Plans, and the campaign to build and sustain preparedness. Much information exists, especially through the FEMA Threat and Hazard Identification and Risk Assessment as well as National Preparedness Report processes, regarding how the states and FEMA regions measure national preparedness.

DomPrep filled some of the data gaps by gathering information from the broad range of disciplines that comprise DomPrep's readership. In DomPrep's nationwide survey, business, government, and community representatives who each have an interest in domestic preparedness shared their thoughts about the state of resilience within their organizations, industries, and communities. From these results, DomPrep derived the following findings and recommendations that are important for policymakers at all levels of government.

I. *Establishing a Resilience Baseline* – Although the definition of "resilience" varies among different disciplines, the basic concept remains: to minimize the effects of a disaster so that operations may rapidly resume to normal, or a new normal. With so many documents available that focus on "resilience," creating and implementing an effective resilience plan can be challenging and require a collaborative public-private effort that is both flexible and adaptable.

II. *Measuring & Mapping Resilience* – Reading literature that promotes resilience does not necessarily lead to action. Regardless of the influences, many organizations/agencies are taking actions to improve planning, assessments, trainings, redundancies, partnerships, and preparedness in general. With a focus shift toward individual needs of employees, businesses are ensuring that staff will be ready and able to respond when needed. Such interdependencies are a critical factor for building resilience.

III. *Identifying Hazards & Capabilities* – Natural, human-caused, and technological hazards can each affect an organization in different ways. Evaluating which hazards are most likely to occur in a particular location, prioritizing essential functions, and determining the existing capabilities are all critical for developing the best mitigation plans and reducing the possible impacts of any disaster. Recognizing interdependencies with outside organizations is also critical for building an effective plan.

IV. *Disaster Planning & Investment Strategies* – Both material and nonmaterial measures may be required to address identified capability gaps. The many financial uncertainties in today's environment are even more apparent with the recent federal government shutdown, which affected much more than just those agencies directly involved. As many changes take place and potential risks/threats increase, it is important to regularly review and update the "living" disaster and resilience plans, but not to "just check a box."

V. *Collaboration & Coalition Building* – Organizations and agencies – both public and private – must collaborate with the broader community to develop effective solutions to resilience issues. Partnering with other groups, becoming members of professional organizations, and collaborating regularly with other federal, state, local, territorial, and tribal stakeholders are some of the ways lessons and best practices can be learned. However, one barrier to resilience that still exists for some is cooperation from other stakeholders.

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I. ESTABLISHING A RESILIENCE BASELINE

Since assuming office in May 2009, FEMA Administrator W. Craig Fugate has changed the paradigm in national preparedness. Holding to the mantra that "there will never be another Katrina," Fugate has shifted the federal government's focus from simply responding within 72 hours to actually stabilizing an incident within 72 hours after an incident. To achieve incident stabilization of a major disaster within three days requires a shift from a government-centric approach to what Fugate termed a "whole-community" response. It is important to remember, of course, that all disasters begin and end locally.

Built around PPD-8, the National Preparedness System involves federal, state, territorial, tribal, and local governments, as well as businesses, faith-based and community organizations, nonprofit groups, schools and academia, media outlets, individuals, and families.[2] Public-private sector relationships are critical, especially considering the fact that only 10 percent of the total workforce is from the public sector, while the remaining 90 percent span private-sector, nongovernmental, and faith-based organizations.[3]

The nation's critical infrastructure – water, power, communication, healthcare, and transportation networks – rests largely within the private sector. Community and faith-based groups are key assets, with leadership and communication structures and significant resources in support of disaster response. The focus of PPD-8 is to strengthen the security and resilience of the nation through systematic preparation for the threats that pose the greatest risk to the nation's security. The first step in this process was to develop the National Preparedness Goal.

The National Preparedness Goal[4] is "a secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk." The Goal describes the 31 core capabilities within five mission areas focusing on:

- Preventing, avoiding, or stopping the threat or actual act of terrorism;
- Protecting citizens, residents, visitors, and assets against the greatest threats and hazards in a manner that allows interests, aspirations, and ways of life to thrive;

- Mitigating the loss of life and property by lessening the impact of future disasters;
- Responding quickly to save lives, protect property and the environment, and meet basic human needs in the aftermath of a catastrophic incident; and
- Recovering through a focus on the timely restoration, strengthening, and revitalization of infrastructure, housing, and a sustainable economy, as well as the health, social, cultural, historic, and environmental fabric of communities affected by a catastrophic incident.

The National Preparedness System[5] then defines the process for strengthening national preparedness and achieving the National Preparedness Goal by: identifying and assessing risk; estimating capability requirements; building and sustaining capabilities; planning to deliver capabilities; validating capabilities; and reviewing and updating capabilities.

As part of the National Preparedness System, FEMA developed the five National Planning Frameworks, one for each mission area. The frameworks describe how the whole community works together to achieve the National Preparedness Goal. Each framework identifies the scope of the mission area and describes the roles and responsibilities, core capabilities, coordinating structures, and relationships to other mission areas. The frameworks also provide relevant planning assumptions to assist in the development of federal interagency operational plans, department-level plans, and plans of state, local, tribal, and territorial governments and the private sector. These plans should provide more-detailed concepts of operations and execution strategies of the frameworks.

PPD-8 also called for development of the National Preparedness Report (NPR), outlining the nation's progress. This annual report is the "feedback loop," which provides a baseline evaluation of the progress made to date toward building, sustaining, and delivering the core capabilities described in the National Preparedness Goal.

This entire national preparedness effort focuses on building and sustaining preparedness. As stated in PPD-8, "The Secretary of Homeland Security shall coordinate a comprehensive campaign to build and sustain national preparedness, including public outreach and community-based and private-sector programs to enhance national

resilience." Achieving resilience at all levels is fundamental to achieving success in national preparedness.

Nevertheless, the challenge of increasing the nation's resilience is daunting. Achieving consensus on solutions, managing investments, and measuring effectiveness are all challenges. At the same time, the nation is facing an aging and declining infrastructure, which is competing in an austere economic environment for funding.

Disasters are having an even greater effect while jurisdictions become more financially constrained. In 2011, as stated in "Disaster Resilience: A National Imperative," the United States was struck with multiple disasters including 14 weather- and climate-related events that each caused more than $1 billion in damages. Total economic damages from all natural disasters in 2011 exceeded $55 billion in property damage. Moreover, disaster events – including blizzards, tornadoes, drought, flooding, hurricanes and wildfires – killed nearly 600 and displaced thousands of households. These disasters had local and national ramifications.

The process of building national disaster resilience requires a whole-community approach involving collaboration among all stakeholders to develop relationships, continuously plan, assess capabilities, identify capability gaps, train, and re-evaluate. This task is never ending. The sustained engagement of the whole community is the final piece of PPD-8 and is required to reach the National Preparedness Goal of a "secure and resilient nation."

Defining Resilience

The use of the term "resilience" is widespread and there are almost as many definitions as there are specific applications of the concept. Individuals, communities, cities, or nations withstand the impacts of a particular disaster, and then bounce back. Their attempts to recover and be stronger become the new normal. They identify new approaches to bring goods and services online rapidly and more efficiently. This results in a greater ability to withstand the effects of the next disaster. Thus, they have become more resilient.

Although there are numerous definitions with many similarities, PPD-8 defines the term "resilience" as "the ability to adapt to changing

conditions and withstand and rapidly recover from disruption due to emergencies."

The U.S. Department of Homeland Security (DHS) expanded this definition to the "ability of systems, infrastructures, government, business, communities, and individuals to resist, tolerate, absorb, recover from, prepare for, or adapt to an adverse occurrence that causes harm, destruction, or loss."[6]

The Infrastructure Security Partnership (TISP), which published the 2011 "Regional Disaster Resilience: A Guide for Developing an Action Plan," further defined disaster resilience as:

> The capability to prepare for, prevent, protect against, respond to, or mitigate any anticipated or unexpected significant threat or event, including terrorist attacks, to adapt to changing conditions and rapidly recover to normal or a "new normal," and reconstitute critical assets, operations, and services with minimum damage and disruption to public health and safety, the economy, environment, and national security.[7]

The 2013 NPR[8] added a definition for "community resilience" – one of the core capabilities in the Mitigation mission area – that "considers economic, demographic, and societal factors that influence an entire community's capacity to adapt to changing conditions and withstand and rapidly recover from disruptions."

Regardless of the specific definition of resilience, the concept has the same basic characteristics. Resilience improves the ability of communities to absorb and withstand the impacts of a disaster event. By identifying capabilities, capability gaps, and resources to fill those gaps, communities become more effective at responding to and recovering from the impacts of disaster. This then becomes the new normal: a new and higher level of protection against the impacts of the next disaster.

Resilience results in having the strength or resistance to withstand disaster impacts without degrading services or functionality. Resilient organizations provide a variety of options and choices so that the organization can adapt to changing conditions or recover rapidly.

As the term "resilience" becomes more common in the preparedness lexicon, the number of documents using the term continues to grow.

The National Security Strategy discusses the relationship between national security and the resilience of citizens, communities, and the economy as well as the requirement to build a resilient nation. The "Quadrennial Homeland Security Review Report," published by DHS in 2010, identifies resilience as one of three foundational elements essential to a comprehensive approach to homeland security.[9]

As community members develop a greater awareness of how natural and manmade disasters can affect their immediate environment, they also develop a better understanding of the resilience concept. For example, the 2013 NPR stated: "FEMA's 2012 national survey on household preparedness revealed that nearly two-thirds of respondents had received disaster preparedness information within the past year from government, community, or media entities, with government being the source reported the least frequently."

Resilience in Literature

The Threat and Hazard Identification and Risk Assessment (THIRA) is one tool used to prepare the annual NPR. Comprehensive Preparedness Guide 201[10] is the instructional manual for preparation of THIRAs and provides a comprehensive approach to identify and assess risks and associated impacts. The 2012[11] and 2013 NPRs summarize the "national progress in building, sustaining, and delivering the 31 core capabilities."

Various sources and guides are available that promote building community resilience. In November 2012, DomPrep published "Building Resilient Regions for a Secure and Resilient Nation,"[12] which documents and studies the topic of resilience in depth. The report provides a plan for sustaining a resilient nation based on key findings from a series of workshops and surveys. In a fiscally austere environment, the Action Plan recognizes the importance of collaboration and recommends that the federal government focus on the high-output area of cross-agency, cross-jurisdictional, and cross-discipline collaboration across the spectrum of national preparedness.

The report found that state and local governments can most effectively use funds by developing and sustaining horizontal collaborative networks, establishing priorities that are bottom-up driven by local jurisdictions rather than top-down by the federal government.

Reflecting FEMA's whole-community mantra, all levels of government must recognize the value of private sector and volunteer organizations in their public-private preparedness collaborations. Finally, ongoing professional development is key for sustaining individual competence and expertise in preparedness-related roles.

The brief and concise primer "Understanding Resilience: Disaster Resilience Begins With You," which was published recently by The Infrastructure Security Partnership,[13] educates readers on resilience from a full-spectrum, comprehensive perspective. Under this lens, "a full spectrum assessment addresses issues at the grassroots level through global concerns, including all threats and all hazards, all capabilities and all capacities, and specific tasks implementing an operational plan framed around a strategy." This primer focuses on the fact that resilience applies to all levels from the individual to the community, regional, national, and global levels.

The Infrastructure Security Partnership also released a working manual for developing resilience at all levels in 2011, entitled "Regional Disaster Resilience: A Guide for Developing an Action Plan," which is a roadmap that describes a systematic process to deal with any major incident or disaster. The guide provides: (a) the fundamentals of resilience, including key definitions and principles underlying the need for and how to achieve regional resilience; (b) a background on infrastructure interdependencies and potential impacts as a result of disaster; (c) a comprehensive list of focus areas and priority issues that should be considered; and (d) a checklist of typical preparedness gaps with recommended activities to address them.

Recognizing that future emergency management challenges will likely be different from those the nation faces today, FEMA identifies the need for new approaches, tools, and capabilities. As such, the emergency management community needs to establish and maintain an eye to the future. To address this need, FEMA established the Strategic Foresight Initiative, which brought together a cross-section of emergency management experts to explore key issues, trends, and other factors, as well as their implications.

"Crisis Response and Disaster Resilience 2030," published by FEMA in 2012,[14] presented the findings from the Strategic Foresight Initiative

from an interesting perspective: a resilient nation in the year 2030 where individuals and communities have immediate access to risk and vulnerability information. It described: the nation's uncertain future; its needs, requirements, and gaps; a look into the future of the emergency management community; and recommendations for preparedness actions. In this vision of the future, investments have been made in resilience strategies, operation plans, and resilience-related policies. Furthermore, whole-community preparedness is evidenced by widespread community coalitions and disaster response and recovery is rapid. The report presented a set of six actionable recommendations to help guide the nation toward increasing national resilience from the local community through the state and federal levels.

In the 2012 book "Resilience – Why Things Bounce Back," Andrew Zolli and Anne Marie Healy presented the concept of a resilient mindset that allows some people to adapt to change more rapidly than others.[15] This concept is important in today's world, where risk adaptation is a key ingredient in resilience yet the job is never done. The cycle will continually evolve and result in a new normal with no single solution because circumstances change.

Survey Results – A Baseline

To determine the level of consistency and understanding in defining "resilience," DomPrep distributed a nationwide survey to its readers, who shared their understanding of the term "resilience." More than half (56.4 percent) of the 600+ survey respondents reported that the PPD-8 definition best describes their understanding of resilience (Table 1). Perhaps the reason for this response is that, unlike the other definitions listed, PPD-8 does not quantify resilience, the impact of the disaster, nor the growth of the community. Rather, it emphasizes the *ability to adapt* to, withstand, and recover from *any* changing conditions and disruptions.

Many of the responses in the "Other" category indicated that resilience is a combination of all of the above, or some combination thereof. Of course, the definition also may vary depending on the context – for example, resilience as it pertains to public health refers to the health of the community members. One anonymous respondent reiterated that, "Resilience is not returning to the status quo, but improving the

TABLE 1: Which of the following best defines your understanding of resilience?	
	Percentage of Responses
Resilience is the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies. (*Presidential Policy Directive 8*)	56.4%
Resilience is the ability to grow and thrive in the face of challenges and bounce back from adversity. (*U.S. Army*)	16.7%
Resilience seeks to absorb the impact of a disaster while still preserving the ability to perform essential functions. (*Facing the Storms – Capabilities Analysis Exercise*)	14.6%
Resilience is the capacity and the capability to recover rapidly with limited damage. (*The Infrastructure Security Preparedness*)	6.6%
Other	5.7%

capacity of infrastructure to withstand anticipated future hazard events (floods, severe storms, etc.)."

From a different perspective, Emergency Management Consultant Ray Pena stated, "Resilience is the latest buzzword for emergency management. Buzzwords like resilience distract from essential emergency management principles." Another respondent seems to agree with Pena, "Resilience is another fancy term for 'business continuity,' which has been around for years. We analyze our risks, mitigate; and what we cannot mitigate, we have a strategic plan and a tactical plan to respond to and recover from situations that may impact our company."

This difference in vocabulary is an important point to consider as the public and private sectors continue to build relationships and collaborate on resilience/business continuity efforts. Traditionally, the term business continuity refers to a single company's operations, whereas the term resilience often encompasses all stakeholders within an entire community.

TABLE 2: Which of the following documents have you read pertaining to resilience? (Select all that apply)	
	Percentage of Responses
Presidential Policy Directive 8 (PPD-8), "National Preparedness"	82.4%
"Threat and Hazard Identification and Risk Assessment Guide: Comprehensive Preparedness Guide (CPG) 201"	49.2%
"DomPrep Action Plan - Building Resilient Regions for a Secure and Resilient Nation," by DomesticPreparedness.com	33.2%
"Crisis Response and Disaster Resilience 2030," by The Federal Emergency Management Agency	33.1%
"Understanding Resilience," by The Infrastructure Security Partnership	16.8%
"Beyond the Storm," by Dane S. Egli	16.4%
"Disaster Resilience: A National Imperative," by The National Academies	15.4%
"Regional Disaster Resilience: A Guide for Developing an Action Plan," 2011 Edition, by TISP	15.1%
"Resilience: Why Things Bounce Back," by Andrew Zolli and Ann Marie Healy	5.7%
Other	11.7%

With numerous document sources referencing the concept of resilience, it seems likely that agencies, organizations, business, communities, and individual citizens that do take action to become more resilient have obtained some information from reviewing the literature. To determine whether this is the case, DomPrep identified 10 of a long list of resilience-related documents and asked the readers which, if any, of these documents they have read (Table 2). Most of the respondents

have read one or more of these 10 documents, but approximately 6 percent still have not read any of them.

The literature referenced in the question and volumes of other documents focused on resilience (Appendix A) have many common themes. Resilience applies to individuals, communities, regions, and whole nations. For resilience to be successful, it requires a collaborative effort on the part of all levels of government and the private sector, including business, industry, and nongovernmental organizations – faith-based, community, and volunteer organizations. Finally, flexibility and adaptability are required because the resilience process never ends and circumstances continually change.

According to one survey respondent, Jeffrey Gaynor, founder and managing member of American Resilience Consulting, LLC, "Absent critical infrastructure resilience, there can be no family, enterprise, community, state, regional, or national resilience and preparedness. Better than a decade ago, the Homeland Security Advisory Council spearheaded the government's awareness and imperative for critical infrastructure and community resilience. Sadly, and despite repeated catastrophes, we have an increasingly long way to go toward achieving resilience."

II. MEASURING & MAPPING RESILIENCE

Progress in Resilience

The National Preparedness Report (NPR) summarizes the nation's progress toward achieving the National Preparedness Goal. It addresses the accomplishments made in building, sustaining, and delivering the 31 core capabilities across the five mission areas of prevention, protection, mitigation, response, and recovery. It also presents an opportunity to reflect on the progress that the whole community has achieved. This includes all levels of government, private and nonprofit sectors, faith-based organizations, communities, and individuals. The 2013 NPR identified that, "Enhancing the resilience of infrastructure systems and maturing the role of public-private partnerships are newly identified national areas for improvement."

Although the 2012 NPR noted that disaster recovery capabilities to enable infrastructure to recover rapidly were in the early stages of development, experiences from Sandy and other events in 2012 confirmed the need for improvement. "Stressed infrastructure systems – including water and wastewater treatment, surface transportation, airports, inland waterways, marine ports, electricity infrastructure, and communications and fuel systems – present obstacles to effective response and recovery operations," according to the 2013 NPR. Although response and recovery on a broad scale were exercised during the National Level Exercise in 2011, which focused on the hypothetical rupture of the New Madrid fault, Sandy demonstrated first-hand the challenges of conducting response and recovery operations with significant degradation of power and transportation infrastructures.

Additionally, the 2013 NPR notes the importance of public-private partnerships as a result of the interdependencies within critical infrastructure and supply chains. In an effort to fully integrate the private sector into national preparedness, FEMA established in July 2012 the National Business Emergency Operations Center, which serves as a virtual clearinghouse for information sharing between businesses and FEMA. In addition, the DHS Office of Infrastructure Protection enhances situational awareness and coordinates with owners and operators of critical infrastructure during response operations through the National Infrastructure Coordination Center.

In other areas, the 2013 NPR indicates that there is clear evidence that adoption of the National Incident Management System (NIMS) increased in 2012. This is critical in local and large-scale disasters because NIMS provides a consistent, nationwide approach and vocabulary for multiple agencies and jurisdictions to work together to build, sustain, and deliver the core capabilities needed in response to a natural or manmade disaster.

One component of NIMS is interoperability. The NPR stated that, by fiscal year 2012, 50 states and territories finished developing State Emergency Communications Plans. Additionally, the nation began transitioning to a national public safety broadband system for emergency communications and continued developing next generation 9-1-1.

In the private sector arena, rapidly restoring electrical power is critical after a disaster. Using on-site electrical generators to power critical equipment rather than depending on the electrical grid increases resilience of the community. By providing on-site power, emergency responders never lose communication, critical water systems stay online, and other identified essential systems continue to operate. This type of mitigation enhances rapid recovery.

The response to Hurricane Sandy demonstrated the resilience of a number of organizations, including Wal-Mart. Numerous Wal-Mart teams from logistics, merchandising, safety and security, human resources, Sam's Club, and store operations, worked with other emergency responders throughout the weekend. In doing so, they ensured that some 900 stores in the path of Hurricane Sandy stayed open as needed and then re-opened quickly after the storm passed. Wal-Mart expected approximately 250,000 associates in the 900 stores to be impacted by the storm. As part of Wal-Mart's resilience plan, the "Big Box" retailer maintains nine disaster distribution centers across the nation, each stocked with the items most needed during and after a disaster. Using their supply chain expertise, Wal-Mart employees can rapidly restock stores in areas affected by disasters to provide communities with access to crucial supplies.[16]

As an example of potential and/or known disasters waiting to happen, the Cascadia Subduction Zone is more than 100 years beyond its cycle of 8-9 magnitude earthquakes. Preparing for such an incident is a necessity. Since the populace may have only 6 or 7 minutes between the earthquake

and a major tsunami, there is no warning system that can reliably warn citizens. Education is the key to survival. People need to understand that if the ground moves, they need to seek high ground immediately. At a minimum, they need to have a 72-hour sustainment kit wherever they go – in their cars, houses, and businesses.

Many universities have committed to increasing their resilience efforts and protecting those on their campuses before, during, and after a disaster. For example, the Drexel University Emergency Preparedness Plan[17] is composed of a master plan, crisis communication plan, functional annexes, and administrative playbooks. This plan provides a roadmap for the preparation, response, and contingency efforts of all of its campuses.

To measure the progress of such resilience efforts when faced with disaster incidents, there are a number of tools available. For example, the Community and Regional Resilience Institute[18] in Tennessee developed the Community Resilience System, which is composed of web-based tools for communities to assess and improve their disaster resilience. The University at Buffalo Regional Institute developed the Resilience Capacity Index, which uses 12 indicators across the categories of economic, sociodemographic, and community connectivity capacity to assess community resilience for 361 metropolitan areas across the nation.

Process Mapping

Resilience begins with gaining control of essential functions. It is critical to map these functions, prioritize them, and determine their interconnectedness. Regardless of the disaster, how an incident affects an organization depends on how that organization reacts to an incident. Factors to evaluate include:

- Time involved in restoring essential resources such as power and water;
- Resilience of the organization's supply chains;
- Reliance on the cyber world and the effects of such disruption;
- Organization's basic functions and interrelationships;
- Capabilities required to continue essential functions;

- Contingency plans in place to restore the affected processes and functions – for example, additional suppliers of essential services and backup generators;
- Investments in material and nonmaterial solutions; and
- Mutual-aid agreements in place to share resources.

Every organization must have a plan that addresses the key points listed above. Organizations can then: (a) evaluate such plans in the context of potential disasters that may affect the organization; (b) estimate the capabilities required to fill the gaps; and (c) fill the gaps to make a more resilient organization and create a new normal. To these same ends, planning is a key component common to each of the five FEMA National Preparedness mission areas.

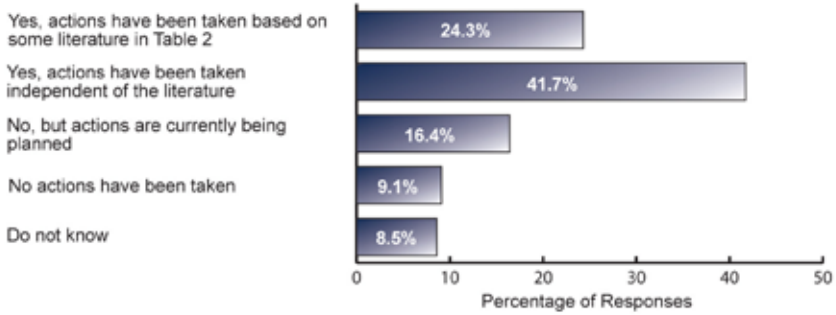
Survey Results – Measuring Resilience

Numerous examples of resilience activities across the spectrum of preparedness exist. Other factors to consider when measuring the level of resilience within a community include: zoning flood-prone areas; collaborating with public health agencies; facilitating public-private relationships; reducing risk; recognizing developmental influences; determining familial and community effects; analyzing the status of infrastructure; coordinating resources; deploying resources, supplies, and equipment; understanding risk; planning for incidents; and restoring essential functions.

Interestingly, although the respondents have read much resilience literature (as indicated in Table 2), they also reported that most of the actions taken by their organizations/agencies (41.7 percent) have been independent of that literature (Figure 1). Some of those actions include planning, assessments, training, redundancies, partnerships, and preparedness.

Many organizations/agencies have been creating new, updated, or more extensive continuity of government and continuity of operations plans, as well as revised emergency operations plans. Gap analysis, threat and hazard vulnerability assessments, and the National Preparedness System's programs and processes are a few ways that are helping to focus planning where it is most effective. Trainings and exercises – for example, active shooter training, and agency-wide

Figure 1:
Have actions been taken to increase your organization/agency's resilience?



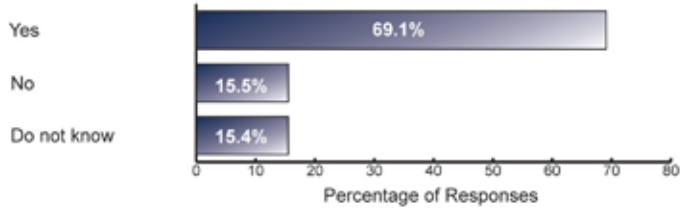
National Incident Management System training – help address gaps discovered during the assessments.

Redundancies should be in place for a variety of assets, which include: worksites, workforces (especially in light of the recent government shutdown), databases, power sources, and communications (including amateur radio equipment and operators). By partnering with other agencies through mutual-aid agreements, public-private partnerships, volunteer recruiting, healthcare coalitions, memoranda of understanding, and recovery programs, agencies can better allocate resources and improve the overall surge capacity for the surrounding area.

Of course, during a disaster, if employees do not report to work, then additional planning and training have little benefit. To address this concern, many survey respondents shared that their organizations and agencies are emphasizing greater personal and family preparedness – issuing "go kits" and encouraging family disaster plans, for example – as well as increasing situational awareness. One organization represented in the survey has even reduced travel time by increasing teleconferences, which offers two benefits: reducing costs; and keeping staff closer to their homes and families.

The interdependencies of essential functions are a critical factor for building resilience. Unfortunately, not all organizations and agencies have fully examined which of their essential functions rely on other functions or processes (Figure 2).

Figure 2:
Has your organization/agency determined which of its essential functions rely on other functions or processes within the organization (e.g., ability to perform security services is linked to a working IT system)?



Two respondents offered reasons for not taking any action to build resilience. One reported that the organization does not have resilience requirements and the other reported that there is "a lot of talk, but no action." Both of these reasons may be applicable to many other organizations as well. Unfortunately, without standards and requirements in place, many organizations may be unwilling and/or unable to allot the time, energy, and money needed for becoming more resilient.

However, Leann Orr, a healthcare coalition planner in Iowa, stressed the importance of taking the first step in the resilience cycle: "Continuous review of resilience literature forces a broader thinking on disaster management and preparation for mitigation, which creates a practice of continual review and refinement of planning and training to create a more robust preparedness program."

III. IDENTIFYING HAZARDS & CAPABILITIES

Hazard Evaluation

The world is ever-changing, demographics are continually shifting, and technology progresses at a rate that planned obsolescence is continuous. At the same time, there is a multitude of hazards to deal with on a more-frequent basis than in the past. There are a number of reasons why disasters are increasing. One of the most common discussions is the impact of climate change on disaster frequency. Such impacts may increase the severity, frequency, or scale of a variety of incidents such as extreme weather events, droughts, floods, and sea-level rise.

There are generally three types of disasters: natural, human-caused, and technological. Natural hazards include, but are not limited to: tornados, hurricanes, earthquakes, floods, tsunamis, wildfires, landslides, snow/ice storms, temperature extremes, epidemics, and volcanic eruptions. The human-caused threats include: terrorism, war, arson, human error, civil disorder, cyber, and political instability. Technological hazards include: dam failures and accidental train derailments, airplane crashes, and radiological releases. Some consider technological disasters as actually intentional or unintentional human-caused disasters since humans create and control the technology. However, it would be difficult to consider the failure of the electrical power grid in the northeastern United States and parts of Canada as anything other than a technological disaster.

Any one of these issues alone would challenge emergency management organizations' policies and procedures. Taken in combination or magnitude, these disasters present significant operational challenges. The goal of resilience is to absorb and minimize the impacts while maintaining or restoring essential functions as rapidly as possible. To understand these hazards, to manage and minimize the impacts, and to reduce or mitigate risks are the basis for developing resilience. Risk management entails identifying hazards likely to affect the organization or community, assessing vulnerabilities, and implementing actions that will result in strategies of risk avoidance, risk control, or risk transfer. Developing risk management strategies and plans can help build capacity for communities to become more resilient to disasters.

As identified in the 2013 National Preparedness Report, FEMA's fiscal year 2012 national survey identified that nearly half of the respondents reported familiarity with local hazards and about half expected to experience a natural hazard, continuing a previous upward trend. This, however, does not reflect an upward trend in personal readiness. The survey also showed no substantial change in the percentage of respondents reporting that they had made a household emergency plan (43 percent) or built a preparedness kit (52 percent).

Capability Gap Identification

As identified previously, process mapping: (a) develops the current state of the organization; (b) identifies the essential functions and the processes associated with the essential functions; and (c) characterizes which activities are most essential by assigning priorities to each function. By mapping interdependencies, organizations identify the interconnected elements of the processes including who and what they rely on inside the organization as well as outside.

In the process of identifying capability gaps, the organization evaluates the impacts of the hazards that may potentially affect the organization or business and identifies the capabilities required to sustain the processes that accomplish the essential functions. These capabilities may be in the form of facilities, equipment, staff, other resources. The organization then looks at these capabilities both qualitatively and quantitatively to determine the importance of each. A critical capability is one that is difficult or impossible to replace with other capabilities. A resilient organization is one that maintains adequate capabilities under duress to perform its essential functions and recover rapidly from disruptions.

The organization then looks at the capabilities, processes, and functions and estimates the impact that potential disaster may have. When evaluating the impacts of hazards, organizations also must consider economic impacts. Financial losses from natural hazards normally fall into two major categories – direct losses and indirect losses. There also are property damage losses and business interruption losses, each having examples that are direct or indirect.

A wide variety of disasters result in direct property damage. However, a transformer fire in an electric power substation results in a

loss of power to the business indirectly affecting production. A disruption in the supply chain as a result of a disaster shutting down suppliers indirectly affects the businesses that rely on that supplier. Enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses rather than waiting for an event to occur – and paying for it afterward.

Survey Results – Hazards & Capabilities

A wide variety of hazards – natural, human-caused, and technological hazards – can affect an organization. Three-quarters of the respondents (76.9 percent) reported that their organizations/agencies have evaluated these hazards based on the probability of the incidents occurring within their jurisdiction (Figure 3). For the 23.1 percent who have not evaluated the hazards or do not know if such evaluations have been done, this would be a good place to begin determining specific threats that may prevent "bouncing back."

Organizations/agencies can identify capability gaps by: (a) evaluating the impacts of such hazards on their services; (b) prioritizing their essential functions; and (c) determining the level of capability these functions have in withstanding the impacts of potential disasters. Of the respondents, 68.5 percent stated that their organizations/agencies have identified their capability gaps (Figure 4).

Organizations and agencies are using various methods to identify existing gaps. Public Health Preparedness Capabilities Assessments, hazard vulnerability analyses, threat assessments, gap analysis studies,

Figure 3:
Has your organization/agency evaluated these hazards based on their probabilities?

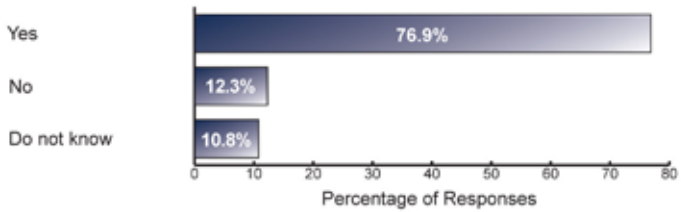
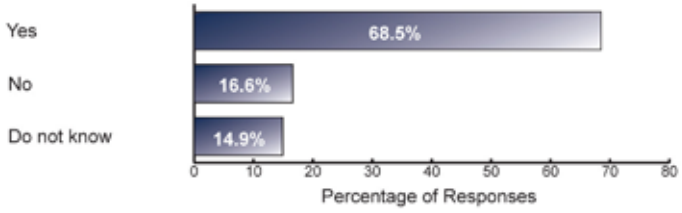


Figure 4:
Has your organization/agency identified its capability gaps?



and statewide GAP analyses to compare actual performance with potential performance are a few examples. Two respondents demonstrate the effectiveness of the Assistant Secretary for Preparedness and Response (ASPR) programs on making public health agencies more resilient.

First, Bruce A. Watson, program specialist for Program Grants Management/Community Preparedness Section of the Texas Department of State Health Services, stated that his Section, "identifies emergency response, mitigation, and training gaps through our 14 contractors covering our 22 trauma service areas. Such gaps are a main component of our state grant application to ASPR. Our contractors meet, train, and monitor the gap delivery to coalition members (hospitals, emergency medical services, fire, etc.) within each trauma service area."

Second, Patrick Cusick, project coordinator for the Office of Emergency Preparedness, Cleveland Department of Public Health, shared his agency's effective gap analysis process. "We continually engage in identifying gaps via our Cities Readiness Initiative program, as well as our Public Health Emergency Preparedness programs, and work jointly with our regional hospital association under Assistant Secretary for Preparedness and Response grants and our emergency management agencies to ensure we are all planning, training, exercising, and responding cohesively."

Critical gaps identified by some of the respondents include: planning anomalies, training needs, recent staff retirements, loss of electric power, written documentation (e.g., memoranda of understanding, written procedures), cyber, information technology infrastructure, and regular

plan maintenance. In some cases, organizations have identified these gaps, but the gaps are "shared throughout the community and, in some cases, the nation." Therefore, fixing them is dependent on the preparedness levels of their vendors and other agencies/organizations.

Small businesses with limited investment dollars are particularly dependent on the preparedness levels of others. As one anonymous respondent stated, "We can't afford any mistakes in the investment we make – it must be optimized and fill the gaps." After determining gaps, the next steps are to write improvement action plans and assign actionable items.

IV. DISASTER PLANNING & INVESTMENT STRATEGIES

Disaster Planning

The last step in the process is to incorporate all of the above activities into a disaster plan, emergency operations plan, continuity of government/business plan, or a combination of plans. A wide variety of disaster-related plans exists at all levels of government, business, and industry. Government sector plans must include all elements of the whole community. According to the 2013 National Preparedness Report, in 2012, 85 percent of states rated their emergency operations plans as adequate to accomplish their missions. Additionally, 61 percent of states involved the whole community in developing those plans, including nongovernmental organizations, the private sector, and groups representing individuals with access and functional needs.

Similarly, private sector plans must take into account the community's emergency operations plan. Because of the whole-community aspect of disaster response, businesses today are demanding greater interface with government to understand how to react to events that threaten business survival. Additionally, businesses can provide significant resources during disasters. As a result, they may be a critical component of the community's emergency operations plan.

The value of such plans, however, lies in the periodic review, updating, and exercising of the plans. In so doing, organizations are continuously evaluating and managing risk.

Investment Strategies for Resilience

At all levels of government, the nation as a whole continues to make progress in resilience. One indicator of the importance of investing in disaster resilience is the amount of money the federal government spends in disaster response and recovery. For example, in the first year of presidential disaster declarations (1953), federal expenditures totaled $20.9 million (adjusted to 2009 dollars) or $0.13 per person. According to the 2012 report "Disaster Resilience: A National Imperative," with many more disaster declarations in 2009, the government conservatively spent $1.4 billion on federal disaster relief or the equivalent about $4.75 per person. The numbers are

staggering. The 9/11 attacks totaled $13.3 billion, and Hurricane Katrina in 2005 led to more than $48.7 billion in federal disaster relief costs.

Planning is a key element in achieving resilience, whether at the individual, organizational, community, or governmental level. In this context, communities can develop multiyear plans and programs that include material and nonmaterial initiatives and projects. These projects could include repairing infrastructure such as schools, clinics, hospitals, and critical services the community provides. Community leaders can prioritize investments based on their significance to life safety, economic sustainment, social value, public health, and the effect on the environment.

Achieving a high level of resilience requires significant investments – both material and nonmaterial. These investments continue to reduce the consequences of incidents. For example, Hurricane Isaac in September 2012 tested investments in levee systems that protected New Orleans. Because of the storm's large size and slow movement, storm surges in certain areas rivaled those of Hurricane Katrina, but the enhanced levee systems around New Orleans withstood the storm's surge, lessening its overall effects.

Material investments in disaster-resistant construction like floodwalls and retrofitting would benefit communities. When hardening residential construction from the impacts of hurricanes, new construction and retrofitting are relatively inexpensive and may include: installing exterior hurricane shutters, high-impact resistant glass in windows, or garage door bracing; strengthening soffits; and securing loose roof shingles.

As in the case of rebuilding homes after Hurricane Sandy, buildings can be elevated as well as flood proofed. Earthquake resilience poses other challenges. A number of critical structures need to function immediately after an earthquake such as hospitals, city halls, fire and police stations, and emergency operation centers. To harden these structures, base isolation consisting of shock absorbing devices that help isolate the building from strong ground shaking greatly reduces the possibility of damage. "Smart Buildings" incorporate techniques that allow the building to adjust to certain changes in conditions, which counteract damaging structural reactions in response to a hazard.

Structural and nonstructural measures are complementary and can be used in conjunction with one another. Risk management strategies often represent the integration of structural and nonstructural measures designed to increase resilience by reducing vulnerability and mitigating consequences. Some risk management strategies that require material investment can leverage nonmaterial strategies such as building code enforcement, land-use management and planning, building codes, insurance, early warning systems, zoning ordinances, and economic and tax incentives. Natural defenses such as swamps and wetlands (green infrastructure) also can help to reduce the impact of flooding on communities. Organizations are encouraged to invest in protective measures through both positive economic incentives (subsidies and grants) and negative incentives such as fines and penalties.

Although state or local agencies can adopt building codes, it is necessary for local agencies to enforce those codes if they are going to be effective in building resilience within a state. Howard Kunreuther, from the Center for Risk Management and Decision Processes, Wharton School of the University of Pennsylvania, postulated in 1996[19] that one-third of the damage caused by Hurricane Andrew in 1992 could have been avoided had Florida enforced its building codes.

In the case of business resilience, there are a number of measures that can reduce business interruption losses. Businesses can increase inventories, identify alternative supply-chain resources, and employ additional operating locations.

Importing resources from other regions with contingency contracts is an example of modifying a business's supply chain to increase capability and resilience. To ensure preparedness, businesses should exercise their continuity of business plans and conduct emergency planning drills.

Communities can encourage resilience through tax incentives, where taxpayers and business owners could receive tax credits for investing in measures that would reduce their vulnerability to the impacts of disasters. There are a number of other financial vehicles for investing in resilience-related measures. To address a catastrophic loss, insurers, reinsurers, and governments can use alternative risk-transfer instruments such as catastrophe bonds. These bonds allow organizations to take

advantage of investor funds in the case of large-scale disaster damage in return for premiums for a certain level of financial protection. Preparedness assistance grants are a key investment vehicle for increasing resilience. Numerous federal agencies within the United States award preparedness-related grants, including the DHS, the Department of Agriculture, the Department of Health and Human Services, the Department of Justice, and the Department of Transportation.

From fiscal year 2010 to fiscal year 2012, DHS programs invested approximately $7 billion in preparedness funds not related to a presidential disaster declaration. Three-quarters of the funding was concentrated on a subset of the 31 core capabilities, which include: Physical Protective Measures, Long-Term Vulnerability Reduction, and Planning.

The Department of Health and Human Services provides preparedness assistance through the Assistant Secretary for Preparedness and Response's Hospital Preparedness Program and the Centers for Disease Control and Prevention Public Health Emergency Preparedness program. Hospitals and other healthcare organizations build coalitions and strengthen medical surge capabilities through the Hospital Preparedness Program. The Public Health Emergency Preparedness Program supports preparedness activities in state and local public health departments. The fiscal year 2012 distribution, according to the 2013 National Preparedness Report, was $352 million in Hospital Preparedness Program funding and $619 million in Public Health Emergency Preparedness funding across tailored U.S. Department of Health and Human Services' capabilities.

Disaster Preparedness Responsibilities

As previously discussed, the national preparedness paradigm has shifted over the years. Before Hurricane Katrina, the federal government provided the bulk of disaster response after local first responders became overwhelmed. The process to mobilize this response was at times bureaucratic and burdensome. One could expect a federal response in 72 hours. Fugate's mandate shifted this paradigm to a goal of stabilizing an incident within 72 hours.

Working to preclude reliance on a federal response will require all levels of state, local, tribal, family, individual, and private sector preparedness: a "whole-community response." In essence, the first

responder on the scene after an incident is one's neighbor – neighbors helping neighbors. Shortly following would be response by local first responders – fire, emergency medical services, and law enforcement, followed by emergency management, and other state and federal resources. However, the key factor is that today's National Preparedness focuses on a whole-community response.

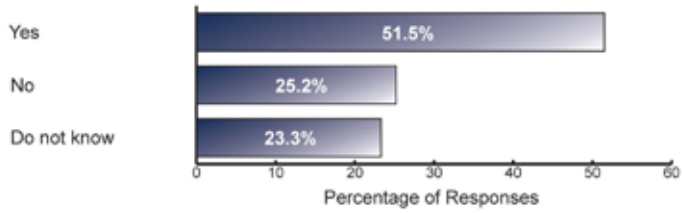
The question regarding one's perception as to who has the responsibility for filling capability gaps that exist in disaster preparedness is an important one. The answer to the question provides insight regarding whether an entity is preparing itself adequately for disasters for which they may be at risk. The 2013 National Preparedness Report addresses this from the states' perspective with the results of the State Preparedness Reports. In the State Preparedness Reports, the states and territories share their observations on expected responsibilities for addressing the gaps that exist in the 31 core capabilities. In essence, they describe the extent to which the states intend to fill their capability gaps.

The results report that capabilities fall along a scale that indicates a gradual shift in expected responsibility between state and federal roles. At one end of the spectrum, in the core capability areas of Planning and Situational Awareness, most states indicate that it is their role to fill the capability gaps and the federal government has little role in these areas. In contrast, at the other end of the spectrum, filling the capability gaps in the core capabilities of Housing, Forensics and Attribution, Cybersecurity, Fatality Management, and Economic Recovery predominantly fall within the purview of the federal government. Although this analysis provides some vision of the states' and territories' intents to fill their capability gaps, little data exists regarding individuals, organizations, and communities at the local level.

Survey Results – Planning & Strategies

The DomPrep survey asked respondents to share the material (i.e., investments) and/or nonmaterial (i.e., agreements) measures that their organizations/agencies have taken to address the identified capability gaps. The most frequently mentioned nonmaterial strategies are mutual aid agreements with local jurisdictions, continuity of operations plans, memoranda of understanding, and other agreements

Figure 5:
If your organization/agency has identified its capability gaps, have material (i.e., investments) and/or non-material (i.e., agreements) measures been taken to address these gaps?



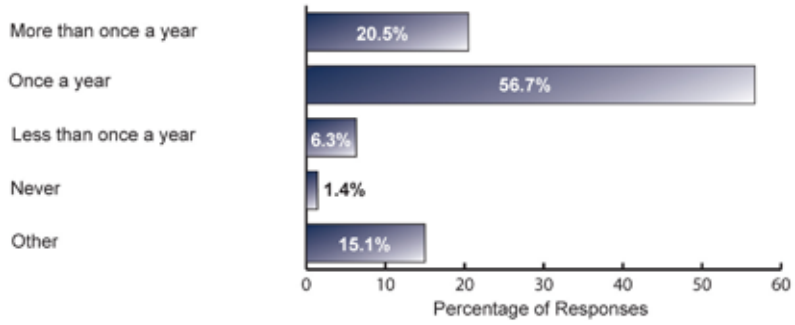
with community partners – for example, local law enforcement agencies, fire departments, transportation companies, printing companies, volunteer organizations, places of worship, schools, hospitals, water companies, ports, organizations like the American Red Cross, and companies such as Budweiser (Figure 5).

Operational plans and procedures that have been or are being updated include: Strategic National Stockpile distribution, surge capacity, mobile command center, evacuation, fuel assurance, volunteer recruitment and training, debris removal, and decontamination. By geographically diversifying critical functions, some agencies/organizations are increasing their ability to maintain operations throughout a disaster.

Material measures include redundancies of systems – for example, communication systems, data and information technology sites, electrical generation systems, water supply, alternate operating sites, cyber security, screening procedures, sheltering facilities, and backup of data. Other material resources that respondents have seen added or updated are building materials, portable generators, cell phone batteries, flashlights, water, food, shelter, security, medical countermeasures, hazmat detectors, additional communications equipment, disaster management software, personal protective equipment, drainage systems, and other equipment purchases.

Michael O'Connell, division chief for Anne Arundel County (Maryland) Fire Department pointed out how budget cuts have affected investments in capital projects for local agencies: "My organization has

Figure 6:
How frequently should a disaster/resilience plan be reviewed and updated?



a mutual aid agreement with all contiguous counties and cities. The State of Maryland has a Maryland Emergency Management Compact that all but one jurisdiction has signed onto. It is a local/state version of the federal Emergency Management Assistance Compact. Investments (i.e., capital projects) have been lagging because of the economy, tax caps, and decrease in grants."

Other respondents echo that concern by diversifying investments, cutting the "least essential" services, and placing more emphasis on their employees rather than their companies' physical attributes. Recent events have demonstrated the interconnectedness of the public and private sectors. One private sector company explained: "With Sequestration, government in-sourcing, and stop works (shutdown), we have had to defer information technology infrastructure investment six months in order to continue to support employees and customers, while trying to stay at the existing corporate rate structure."

With so many changes taking place and so many potential risks and threats, it is important to regularly review and update disaster and resilience plans. Most respondents agree that, at a minimum, these plans should be updated at least once per year, with additional assessments before and after an actual (or even simulated) disaster (Figure 6). As such, the disaster/resilience plan becomes a "living document" that is constantly changing.

Joseph LaFleur, manager at GP Strategies Corporation, however, warns about changing a resilience plan too frequently: “Once every two years [is preferred] so it gets into the regular emergency planning review cycle. It is budget driven and needs about two years to evaluate periodic progress by the executive level. Planning caretakers can update it as activities warrant. Don’t make work to review it just to check a box.”

V. COLLABORATION & COALITION BUILDING

Collaboration & Coalition Building

The success of a national preparedness system is predicated on building broad-based coalitions that link people together to solve problems and build trust. Building public-private partnerships for community resilience is fundamental to the whole-community approach to preparedness. In fact, the 2013 National Preparedness Report (NPR) states that enhancing the resilience of infrastructure systems and maturing the role of public-private partnerships are newly identified national areas for improvement.

Public-private partnerships are defined by the United Nations as "fostering relationships between governments and companies to strengthen cooperation, funding, compliance with regulatory and safety standards, and contribute to building the capacity and resilience of communities to disaster."[20] Public-private partnerships enable government and business stakeholders to collaborate in planning, building, sustaining, and delivering capabilities greater than the sum of their parts.

"Disaster Resilience: A National Imperative" presents the following recommendation: "The public and private sectors in a community should work cooperatively to encourage commitment to and investment in a risk management strategy that includes complementary structural and nonstructural risk-reduction and risk-spreading measures or tools. Such tools might include an essential framework (codes, standards, and guidelines) that drives the critical structural functions of resilience and investment in risk-based pricing of insurance."

The 2013 NPR cites the widespread establishment of Citizens Corps Councils that are engaging the whole community in planning, education, training, and connecting with volunteers in disaster planning and response. The NPR also discusses lessons learned from the Hurricane Sandy Response and the value of public-private partnerships. The American Red Cross and the Salvation Army sheltered thousands of survivors in addition to delivering more than 15 million meals and snacks. More than 23,000 disaster response volunteers participated in the response. This is an indicator of the huge capability that Voluntary Organizations Active in Disaster can bring to the table.

FEMA and American Red Cross databases indicate that there is a national network of 63,000 shelters and American Red Cross supplies can support 350,000 shelter residents. The identified shelters have an evacuation capacity of over three million and the American Red Cross calculates having a post-disaster shelter capacity of 850,000. The American Red Cross also can provide disaster relief supplies to support 500,000 people with needs other than shelter.

FEMA and the American Association of Retired Persons consummated a partnership agreement to promote building resilience in homes, neighborhoods, and communities. Coordinating with the private sector is essential to collaboration and coalition building. Both the National Business Emergency Operations Center and the National Infrastructure Coordination Center perform critical information sharing and coordination functions with the private sector during response, which aids recovery and builds resilience.

Additionally, DHS has expanded some infrastructure assessment activities – including the interagency Regional Resiliency Assessment Program – to include all-hazard resilience objectives in the 2013 NPR. The assessments analyze the resilience of critical infrastructure systems within a particular geographic region. By the end of 2012, the DHS Office of Infrastructure Protection had partnered with stakeholders to complete 27 Regional Resiliency Assessment Program assessments. Each assessment identifies: critical infrastructure dependencies; interdependencies; cascading effects; and state, local, tribal, and territorial capability gaps.

There are many examples of collaboration and cooperation with public-private partnerships. Through a Cooperative Endeavour Agreement, Louisiana is developing the Louisiana Business Emergency Operations Center that interconnects with the state emergency operations center. Its purpose is to improve disaster preparedness and response by improving communications between government and business/industry before, during, and after a disaster. The Center also facilitates communication and coordination through the public-private partnerships with the requests and needs of nonprofits through members of the national and state Voluntary Organizations Active in Disaster. This model has gained the attention of DHS, and neighboring Gulf states that have expressed interest in establishing Business Emergency Operations Centers within their own states.[21]

The U.S. Postal Service is prepared to use its resources in the event of a public health emergency to help distribute medical countermeasures. Medical countermeasures dispensing by the U.S. Postal Service supplements mass dispensing sites and other distribution methods. In a May 2012 full-scale exercise, according to the 2013 NPR, participating local and state agencies and nongovernmental organizations succeeded in delivering simulated antibiotics to more than 95 percent of nearly 35,000 residential mailing addresses across four different zip codes in Minneapolis and St. Paul, Minnesota.

In an effort to increase emergency preparedness and resilience, FEMA developed a nationwide community-based campaign called *America's PrepareAthon!* The purpose of the program is for individuals, communities, and organizations to improve their levels of preparedness by increasing their: (a) understanding of the hazards potentially affecting their communities; (b) knowledge of protective and response actions; and (c) participation in community planning efforts. As a national effort with a national vision, the program provides a consistent and coordinated communication and outreach strategy for resilience.[22]

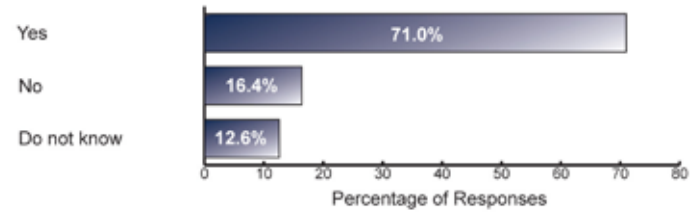
Another aspect of collaboration and partnership is the networking and knowledge gained through conferences and workshops. Numerous organizations have frequent conferences and workshops that focused entirely on or have breakout sections on disaster and resilience.

Survey Results – Collaboration

In today's interconnected environment, it is not surprising that the majority of respondents reported that their organizations/ agencies: (a) collaborate with others in the industry or in the broader community (71.0 percent) to develop effective solutions to resilience issues (Figure 7); and (b) participate in outside groups, conferences, and/or workshops (76.9 percent) focused on disaster management and resilience (Figure 8).

Respondents provided a broad range of partner groups, from local emergency planning committees to FEMA and, in some cases, international emergency management agencies. These partnerships help various stakeholders collaborate on lessons learned and best practices to reduce the effect of future disasters. By collaborating and planning with law enforcement, utilities, public health, emergency management,

Figure 7:
Does your organization/agency collaborate with others in the industry or In the broader community to develop effective solutions to resilience issues?



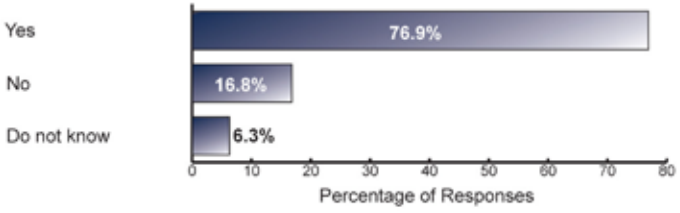
pharmacies, schools, hospitals, faith-based organizations, and many others, agencies/organizations can strengthen their level of resilience.

Some respondents also contribute to their communities' resilience efforts as members of professional organizations – for example, Association of Contingency Planners, International Association of Emergency Managers, International Association of Fire Chiefs, National Association of County and City Health Officials, and Amateur Radio Emergency Services. Others have joined or collaborated with Community Emergency Response Teams, Medical Reserve Corps, and InfraGard.

Regardless of the specific combination of collaborative partners, all stakeholders – from both public and private sectors – should be involved throughout the planning process. Unfortunately, as one respondent noted, it can be difficult at times to gain the cooperation of some of those stakeholders. This barrier has been broken in some jurisdictions, but still exists in others.

Perhaps one of the best ways to break this barrier is to participate in outside groups, conferences, and workshops. In one interesting example, Patrick J. Hoy, emergency management specialist at Billings Clinic in Billings, Montana, noted: "We not only have a close working relationship with our competitor hospital, but we also have very close relationships with all community partners (police, fire, ambulance, city, state, county governments, airport, etc.) through monthly meetings of the local emergency planning committee and a separate exercise planning team."

Figure 8:
Have you or your coworkers participated in any outside groups or in any conferences or workshops focused on disaster management and/or resilience?



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KEY FINDINGS & ACTION PLAN

Although resilience is not black and white, and some of the answers to the questions asked in the resilience survey are not simply yes or no – but rather varying degrees of somewhere in between – this report concludes that many agencies and organizations are making progress toward resilience. Each person, organization, and agency, however, still has a critical role to play.

In his 2011 Naval Postgraduate School thesis, Gordon S. Hunter captured this thought, which is still relevant today, "Citizens who hold a cultural bias towards independence and freedom of action should be more inclined to take necessary actions to preserve their liberties and way of life. Likewise, citizens of a community that leans toward looking for government to preserve the status quo will be less inclined to take action on their own behalf, either in preparation for or response to an event."[23]

The current budget sequestration and the recent federal government shutdown highlight the interconnectedness of the United States and everyone who resides therein. Such federal actions serve as a reminder that each person, each organization, and each community must take steps toward becoming more self-sufficient and less dependent on the limited and declining federal resources. Decision makers at all levels must ensure that resilience remains a high priority.

When creating a resilience action plan, there are many key points to consider, including but not limited to:

- Being involved from the planning stage through the response and recovery phases;
- Developing a common vocabulary between the public and private sectors;
- Collaborating within and between all levels of an organization – administrative, training, technical, operational, and middle and upper management;
- Demonstrating flexibility and adaptability when updating plans to accommodate changing circumstances;

- Preparing employees at the personal level, so an organization, its region, and the nation as a whole can be better prepared;
- Making resilience (or business continuity) a standard practice regardless of an organization's size or the official requirements and duties of its employees;
- Assessing hazards to locate capability gaps;
- Evaluating resilience plans and updating them as often as needed;
- Providing more engagement, direction, and leadership from the federal level; and
- Delegating work and allowing all levels (including volunteers and their organizations) to provide needed efficiency leverage and involvement.

Resilience must be locally empowered by the private sector, volunteer organizations, and individuals. Although confidence in the existing federal processes is low, both the public and private sectors can learn a lot from listening to and collaborating with all stakeholders at all levels.

EXECUTIVE BRIEFING SYNOPSIS

On 18 November 2013, DomPrep hosted an executive briefing at The National Press Club in Washington, D.C., to present the Resilience 2013 – Survey & Report. The keynote speaker was Thad Allen, admiral USCG (Ret.), executive vice president at Booz Allen Hamilton, and former commandant of the U.S. Coast Guard. Other speakers included: Donald "Doc" Lumpkins, director at the National Integration Center, Department of Homeland Security/Federal Emergency Management Agency; Dane Egli, national security and homeland security advisor at Johns Hopkins University Applied Physics Laboratory and DomPrep40 advisor; Marko Bourne, principal at Booz Allen Hamilton and DomPrep40 advisor; and David C. Van Gasbeck, strategic advisor for the Preparedness Leadership Council, International, who shared the survey results and the report findings.

Making Tough Decisions

Thad Allen began the briefing by discussing the rhetoric and semantics of resilience. The many definitions of "resilience" and interdependencies may add confusion for those who already live in complex social and technological environments. Allen has observed that: "There is increasing discussion about the interaction of the human environment and the built environment, and what that means." As such, fundamental changes in the natural environment and the built environment are creating tough choices regarding topics such as devastated coastal communities, use of eminent domain, and the evolving role of government.

Adding to this complexity, whether nature (natural causes), humans (human behavior), and/or technology (built environment) are the specific cause of a disaster, all are ultimately affected. For example, Hurricane Katrina in 2005 and Hurricane Sandy in 2012 affected the survivors and their surrounding communities in very different ways based on factors including: density of the population; age, amount, and type of the critical infrastructure; access to gasoline and other vital energy products; and transportation. To manage such complexities, Allen recommended breaking down the problem into parts in order to address each part individually.

Preconditions are one part that emergency planners must address before a disaster occurs. The incidents themselves do not create preconditions, but they certainly can add to the magnitude of the consequences that result following an incident. Addressing preconditions and other concerns require regional resilience, beginning at the local level, to determine: (a) what issues are the most relevant; (b) what risks exist in the natural, human, and technological environment; and (c) what the region can do to address these risks.

Because nature, of course, does not follow economic or geographic boundaries, human behaviors must change in order to create a more compliant, participatory response that does not burden limited resources when an incident occurs. The discussions and decisions required to make such behavioral change are difficult. For example, if there were a very high risk of flooding to a particular area, perhaps relocating vulnerable populations and not rebuilding five times would be less costly – with regard to both monetary and human losses – than the cost of responding to and recovering from a sixth flood disaster in the same community.

Turning Theory Into Practice

Doc Lumpkins addressed the need to turn theory into practice by finding ways to: measure progress, better handle risk, and avoid stressing the system. By focusing on the most probable risks and hazards, communities can determine what those hazards mean to them and reach out to surrounding areas to begin identifying opportunities for resilience. Together, communities are capable of developing mitigation planning strategies and determining what resources they currently have, what resources they still need, and where the gaps exist. "Advanced preparedness," as Lumpkins called it, is difficult because it involves determining: (a) what needs to be done and get it done before any incident occurs; as well as (b) which risks are acceptable, even though they may be passed on to others.

There are steps, though, that communities can take to reduce the capability and resource requirements. One example is to build significant emergency medical services (EMS) capacity for those facing tornadoes. In addition to using safe rooms to reduce the EMS requirement, Lumpkins suggested asking the same question that Allen raised: Does it make sense to rebuild? Of course, such questions require collaborative open discussions that involve the whole community.

Cooperation and coordination are a critical component for operationalizing the public. Lumpkins pointed out that risk assessments do not always require engineers and scientists, but rather a sheriff, a town mayor, and a few other community members could sit down in a diner to start the discussion about their town's risks and capabilities. School violence initiatives are just one way to begin the discussion, especially soon after such incidents occur within other communities across the nation. Everyone must talk to each other, but it is not reasonable to set the same bar for both small and large communities because the risks and resources may vary greatly. The key for any community is to not miss opportunities for discussion as they arise.

In addition to cooperating and coordinating within a community, modern technology makes it increasingly easier for communities to network with other communities. A structural approach to recognizing problems and solving them includes: understanding acceptable risk (what to plan for and not plan for); providing outreach to and receiving feedback from the public (including social media); applying force multipliers to resources to meet the communities' needs; and recognizing that there are some things that do require government assistance.

Establishing a Resilient Culture

Dane Egli emphasized the need to bridge the gaps between the public and private sectors and to change the "culture" of resilience. Discussions about complex topics must include both of these sectors because neither sector can accomplish resilience without the other. It takes more than policy and a proliferation of documents to attain the desired effect. Culture, for example, plays a critical role in community resilience as well as training efforts.

Trainings conducted in the United States – from local exercises to the National Level Exercises – currently do not include all stakeholders within all communities. Many of the trained personnel in the United States receive funding to cover the costs associated with exercises, but many others with limited time and resources are not involved. When faced with a disaster, people tend to rely on their past training as well as their current comfort zones. By training a broader representation of those whom a disaster may affect, a culture of resilience can grow.

Egli stated: "We cannot kill enough terrorists to make ourselves secure…. We cannot harden our facilities enough to prevent or protect that which is inevitable…. What we can do, though, is engage in a measurable, quantifiable, implementable model (a framework) that is repeatable, and generalizable, to begin to understand the steps that can be tailored for that community." Engaging the private sector starts with listening to these stakeholders, who generally will cooperate, collaborate, and share when needed.

Sometimes these collaborative efforts involve examining why things are not "bouncing back." "Smart resilience," as Egli termed it, means that sometimes it is necessary to recognize that things should not bounce back. Once again, communities must make the tough decisions about building a new normal that is more resilient than what was lost. Risk mapping is one way to visualize and understand the interdependencies. From those maps, emergency planners can begin to perform analytics and research, apply a measureable action, create long-term mitigation in a resource-scarce environment, and develop action plans that reflect the input from these maps and from the analytics.

"If you want to look at the value proposition of resilience (the return on investment)," Egli suggested, "look at the studies that have been done." Based on those studies, he warned private sector stakeholders that if they do not promote a more resilience culture, "Your stock returns go down, your share price volatility goes up, your operating income goes down, sales growth goes down, and cost goes up." The Boston Marathon bombings on 15 April 2013 serve as a prime example of how the city amplified the impact of the incident by shutting down the city and its economy, which caused a ripple effect throughout the region.

Leveraging a Data-Rich Society

Marko Bourne addressed the challenges associated with information, data, and analytics. Although a data-rich nation, the United States has stovepipes of data analysis. Federal agencies have the ability to pull and analyze large amounts of data, but do not always know what to do with this data. After 9/11, the nation recognized the need for more preparedness, which led to investments of billions of dollars in preparedness grants. Unfortunately, the agencies offering those grants did not establish a baseline to measure the effectiveness of such investments.

In addition, local and state agencies used those funds to purchase "stuff," but many did not have a plan to sustain that stuff after the grant monies ran out.

After establishing a baseline and analyzing the necessary capabilities, the next step is to measure and map the results. Resilience is more than simply a public safety concern; therefore, risk maps must integrate disparate sets of data including the aging infrastructure. Although the data itself may or may not be classified, the tools that already exist for analyzing the data are not. The federal government, though, currently does not provide adequate feedback for the state, local, and private sectors to be able to understand, use, and share these tools – and relevant data – across communities.

It is difficult, if not impossible, to make disaster planning and investment strategies without sufficient data. Therefore, Bourne suggested that current investments should focus on: providing information, marrying the data, not worrying about "turf wars," sharing the data across industries, and turning over the tools for others to use free of charge. Local jurisdictions need answers, but the data also has to be easy for them to understand.

Bourne described two types of funding: (a) pre-disaster (preparedness); and (b) post-disaster (response and recovery). With money still going toward recovery efforts associated with Hurricane Katrina eight years after the disaster, it is not difficult to determine which type of funding would be more cost effective going forward. Investments in preparedness can be very expensive – especially considering the uncertainty of what incidents may or may not occur – but not as costly as responding to and recovering from an actual event.

Addressing Resilience Challenges

The discussions from the speakers and attendees at the November Executive Briefing provided various suggestions for addressing the nation's resilience challenges:

- Take a more academic approach
- Test the hypotheses
- Do not ignore the problems
- Take steps to make resilience a priority

- Normalize the fact that risks and threats exist
- Localize the enthusiasm with nongovernmental organizations
- Have serious conversations
- Cooperate with other stakeholders
- Start with discussions about protecting children to create common goals
- Ask the right questions before an incident occurs
- Determine the region's acceptable level of risk
- Establish a resilience baseline and timeline for performance
- Reduce the capability requirement
- Develop risk-management strategies
- Create a system that includes administrative support, logistics, contingencies for loss of continuity of government and/or continuity of operations, accountability, and a framework

It is important to keep in mind that resilience is not a U.S.-specific concern. Sharing lessons learned and information should take place internationally as well. LTC Ariel Blitz, foreign liaison officer for Israeli Home Front Command, shared his experience about resilience and preparedness. The Israeli government has successfully created a culture of resilience: Citizens are proud of their efforts if they are adequately prepared, or ashamed of their efforts if they are less than prepared. The perception and branding of "preparedness" are the keys to making efforts more effective and, in general, creating more-resilient communities.

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APPENDIX D
Demographics of Respondents

In what sector are you employed?	
	Percentage of Responses
Fire Service	8.3%
Law Enforcement	4.7%
EMS	3.2%
Emergency Management	11.6%
Public Health	16.1%
Hospital (including VA)	8.5%
Federal Government	8.2%
Military	1.8%
State/Local Government	10.5%
Non-Government Organizations (NGOs)	3.3%
Privately Owned Company	9.3%
Publicly Traded Company	4.2%
Self-Employed	1.7%
Not Employed	0.5%
Academic Institution	4.8%
Student	0.0%
Other	3.3%

What type of position do you hold?	
	Percentage of Responses
Upper Management	21.6%
Middle Management	31.9%
Operations	18.1%
Technical	7.7%
Training	5.2%
Administration	6.6%
Other	8.9%

Disaster resilience is everyone's business and is a shared responsibility among citizens, the private sector, and government. Increasing resilience to disasters requires bold decisions and actions that may pit short-term interests against longer-term goals. As a nation we have two choices. We can maintain the status quo and move along as we have for decades – addressing important, immediate issues such as the solvency of the National Flood Insurance Program (NFIP), the most effective ways to discourage development in high-risk areas, and how to improve the speed and effectiveness disaster response. Or, we can embark on a new path – one that also recognizes and rewards the values of resilience to the individual, household, community, and the nation. Such a path requires a commitment to a new vision that includes shared responsibility for resilience and one that puts resilience in the forefront of many of our public policies that have both direct and indirect effects on enhancing resilience.

Committee on Increasing National Resilience to Hazards & Disasters
Committee on Science, Engineering & Public Policy
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