REGIONAL DISASTER RESILIENCE

GUIDE FOR DEVELOPING AN ACTION PLAN

2011 Edition

Draft for External Review

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INTRODUCTION

Welcome to the 2011 edition of The Infrastructure Security Partnership (TISP) *Regional Disaster Resilience Guide.*

The *RDR Guide*, as it has come to be called, is a roadmap that describes a step-by-step process that can be customized to develop a cross-sector, multi-jurisdiction strategy to improve capabilities to deal with any major incident or disaster. Like the original version published by TISP in 2006, the updated *Guide* contains basic information—key definitions and fundamental principles underlying the need for, and how to achieve regional resilience; background on infrastructure interdependencies and potential impacts; a comprehensive list of focus areas and priority issues that should be considered, and a checklist of typical preparedness gaps with recommended activities to address them. However, the 2011 *Guide* has been significantly expanded with much new information and insights gleaned from the past five years of lessons learned from disasters and major disruptions, exercises, workshops, studies and assessments.

Most importantly, the *Guide* outlines a multi-step approach to develop a regional resilience Action Plan through identifying and bringing together in partnership the necessary broad stakeholder base of public, private and non-profit organizations; conducting workshops, a baseline assessment of capabilities and needs; an interdependencies exercise, and other activities to develop a stakeholder-validated resilience roadmap. Lastly, the *Guide* addresses the challenges facing Action Plan implementation and offers practical ways to organize, maintain, and sustain continued stakeholder collaboration and interest and obtain necessary funding and expertise to move towards regional resilience. To supplement the *Guid*e, a web-based *RDR Guide Toolkit* of resources is available at the TISP website ***(www.tisp.org).*** *The RDR Guide Toolkit* provides examples, templates, and information on plans, procedures, tools, technologies, and other "best practices" with useful links to websites of government, private sector, and non-profit organizations for additional information, as well as access to TISP member expertise.

For Whom the *Guide* is Intended

The *Guide* is designed for use by any practitioner or expert who wishes to improve the capabilities of their organization or community to withstand major incidents or disasters. Typical users include local officials—city and county emergency managers, public health officers, community planners; state officials—emergency management and homeland security directors; energy, transportation management, and environmental protection officials; utility and business owners and operators interested in improving security outside their "fencelines;" businesses that want a better understanding of economic impacts from high-probability threats; schools and other academic institutions, community organizations, and special interest groups—faith-based organizations and non-profits serving people in need or having other community health and safety missions.

How to Use the *Guide*

For those who want to build a public-private partnership in their community or region to enhance resilience, the *Guide* provides a blueprint for them to follow. For other users who wish to evaluate and or upgrade organizational continuity plans to take into account interdependencies impacts and supply chain disruptions, the *Guid*e provides a comprehensive inventory of needs, gaps, and recommended activities. The *Guide* can be used by local emergency management officials to spearhead development of a multi-jurisdiction emergency preparedness plan or a state homeland security official to convene critical infrastructure owners and operators to gain understanding of state-wide interdependencies and help meet infrastructure protection goals. Public health officials and healthcare organizations can use the *Guide* to develop community health resilience action plans. The *Guide* can also be employed to look at regional resilience specific to particular infrastructures or interests. Likewise, the *Guide* can be used to examine resilience needs associated with a particular threat from cyber attacks and disruptions, a bio-attack, or radiological incident.

Assuring *Guide* Utility

The *Guide* was developed through a multi-stakeholder Regional Infrastructure and Disaster Resilience Task Force and review process to assure it is as comprehensive as possible, user-friendly, usable, and will be used. The *Guide* will be periodically updated with new lessons learned and insights from its users. TISP welcomes suggestions and recommendations for increasing the *Guide's* utility. Please send them to www.tisp.org.

REGIONAL INFRASTRUCTURE AND DISASTER RESILIENCE TASK FORCE

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American Council of Engineering Companies
American Resilience, LLC
American Society of Civil Engineers
American Society of Mechanical Engineers
American Water Works Association
Anodyne Electronics Manufacturing Corp.
Applied Engineering Management Corp.
Argonne National Laboratory
ASIS International
Association of Development Organizations
Booz Allen Hamilton
Bradley County, Tennessee
California Emergency Management Agency
CDM, Inc.
Chevy Chase Bank
City of Chicago, Office of Public Safety
City of Keene, NH
Community and Regional Resilience Institute
CRS Port Security
DRI-Institute for Continuity Management
DRS International LLC
Dutko Worldwide
Edison Electric Institute
Environmental Protection Agency
National Research Council
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Homeland Security Information Corp
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National Guard Bureau
National Infrastructure Institute
National Institute of Science and Technology
Navy Federal Credit Union
New Jersey Office of Homeland Security and Preparedness
New Jersey Institute of Technology
NIST
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Pacific Northwest Center for Regional Disaster Resilience
Parsons
PBS&J Corporation
Port of New Orleans
Port of Seattle
Port of Tacoma
PRIME Engineering and Architecture
Regional Integration Center
Ridge Global
Safeway
SAIC
Sandia National Laboratories

Seattle Police Department, WA
The Scalingi Group, LLC
The Sentinel HS Group, LLC
Setracon, Inc.
Society of American Military Engineers
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The Sentinel HS Group, LLC
The West Point Academy
Transportation Research Board
University of Southern California
University of Maryland Department of Computer Science
U.S. Army Corps of Engineers
U.S. Department of Defense
- Air National Guard
- NORTHCOM
- Office of Homeland Defense

U.S. Department of Energy
- Office of Electricity Delivery and Energy Reliability

U.S. Department of Health and Human Services
- Office of Human Services Emergency Preparedness and Response, Administration for Children and Families

U.S. Department of Homeland Security
- Directorate for National Protection and Programs
- Federal Emergency Management Agency
- Intergovernmental Affairs
- Office of Health Affairs
- Office of Infrastructure Protection
- Office of Policy
- Office of Science & Technology
- Private Sector Office
- Transportation Security Administration

U.S. Department of Transportation
- Federal Highways Administration

U.S. Environment Protection Agency
- Office of Water
- U.S. Health Public Service Officer assigned to EPA

University of Maryland
University of Southern California
URS Corporation
Vanderbilt University
Volpe Center
West Point
Walla Walla County Emergency Management, WA
Washington State Department of Ecology

TISP Critical Infrastructure Resilience Committee Co-Chair, and Principal Integrator of the Regional Disaster Resilience Guide

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REGIONAL DISASTER RESILIENCE GUIDE FOR DEVELOPING AN ACTION PLAN

GUIDE OVERVIEW

The *Regional Disaster Resilience Guide* is an updated and expanded version of the original *Guide* published in June, 2006 by The Infrastructure Security Partnership (TISP). Like its predecessor, the updated *Guide* provides a useful and usable tool to enable practitioners and experts from government, the private sector, and other interested organizations to develop and operationalize an actionable strategy and ongoing process to collectively improve capabilities to withstand major events and disasters in today's complex and interdependent world.

The approach outlined in the updated *Guide* remains essentially the same holistic, systematic multi-step process that provides a baseline of stakeholder-validated regional resilience needs and activities covering preparedness through long-term restoration. However, the *Guide* has been further refined through numerous applications and pilot projects across the United States and in Canada and updated with lessons learned from disasters and events over the past several years, including the 2011 Japanese subduction zone earthquake and tsunami, the New Zealand, Chile, and Haiti major earthquakes, and the 2010 Deep Water Horizon oil spill disaster in the Gulf of Mexico.

The updated *Guide* also reflects the broader knowledge base on resilience that exists today, including a range of new "best practices" and the increasing focus on all-hazards that has gained traction in the last few years. It is designed to be complementary with U.S. federal infrastructure protection and disaster preparedness/management policies, directives, and programs, such as the 2010 National Security Strategy, National Infrastructure Protection Plan, and the National Response and National Recovery Frameworks. The *Guide* is also compatible with similar international activities and initiatives.

A Simple, "How To" Path to Resilience

TISP has been in the vanguard of those calling for a national focus on infrastructure and regional resilience since its inception in early 2002. The original *Guide* was a direct outgrowth of this recognition. TISP's goal was to raise the awareness of and inform the broad stakeholder audience within the United States and worldwide on the importance of resilience. This updated *Guide* is likewise intended to strengthen organizational and regional resilience. Written with minimal acronyms and common language, the *Guide* provides users with key definitions and a set of fundamental principles that underpin disaster resilience, and a framework for building a stakeholder-driven resilience strategy.

Using a practical "how to" approach, the *Guide* lists 14 focus areas and respective detailed priority issues covering all hazards and recommends short, medium, and longer-term activities to address the respective shortfalls. It is important to note that the *Guide* is intended for the broad range of local to international stakeholders. Consequently, it does not recommend national and other public policies, or government and commercially-developed tools and technologies.

A TISP website *RDR Guide Toolkit* resource provides information and useful templates. The *RDR Toolkit* also provides links to government agency, private sector and non-profit websites where users can find educational materials and information on available policies, tools, technologies, and best practices. This enables users to avoid "recreating the wheel" and fosters standardization across infrastructures and regions. The *RDR Guide Toolkit* website also provides information and links to resilience initiatives, public-private partnerships, and contact information of TISP members who can provide additional advice and expertise on using the *Guide.*

The Need for a Holistic Approach

There are two closely related factors that necessitate development of a holistic, regional, approach to all-hazards resilience that involves engaging the broad stakeholder community:

- **Infrastructure Interdependencies.** In the past decade, critical infrastructures and other essential service providers that enable societies to thrive and grow have become increasingly interconnected and interdependent from the local to global levels. These infrastructures include energy (electric power, natural gas, fuels); telecommunications, transportation (rail, road, maritime); water and water treatment systems; banking and finance; emergency services; government services; hospitals, healthcare and public health; agriculture and food; commercial facilities; nuclear reactors; materials and waste; dams and levees; manufacturing; chemical facilities; and postal and shipping. To a large degree, this trend towards ever greater interconnectivity has been created by growing reliance on electronic systems and virtual systems, computer processing and the Internet for managing and operating systems and infrastructures. This interconnectivity and the resulting interdependencies can create unexpected vulnerabilities and significant consequences. Although security and disaster management practitioners are beginning to focus on interdependencies and the vital connection with resilience, there remains limited understanding of them, the vulnerabilities they create, and how to prevent or lessen their impacts. Disruptions in one infrastructure can cascade, affecting more than one infrastructure, impacting essential government services, businesses, and individuals in a region with far-reaching health and human safety, societal, economic, environmental, and national security consequences. ***(For a short "Infrastructure Interdependencies Backgrounder" see Appendix C.)***

- **Information Sharing and Public-Private Partnering.** Understanding infrastructure interdependencies necessitates bringing together local public, private, and other stakeholders with state and federal partners to share information and address regional vulnerabilities and consequences under different scenarios. To accomplish this is greatly challenging, given cultural, legal and bureaucratic constraints and the need to ensure security of sensitive and proprietary data. The key is to create, maintain and sustain public-private partnerships to provide trusted forums to identify resilience needs and gaps and facilitate continual resilience improvements at the organizational and regional levels.

How the *Guide* was developed—the TISP Regional Infrastructure and Disaster Resilience (RIDR) Task Force

For the original *Guide,* a Task Force was convened of more than a 100 practitioners and experts from federal, state, and local government and private sector organizations, associations, and

academic institutions. For the updated *Guide*, a similar Task Force was established, but with an expanded mandate to focus on resilience needs at the asset level with the intent of producing a companion *Critical Infrastructure Resilience Handbook* for owners and operators. This RIDR Task Force also included representatives from organizations and associations that had similar resilience activities underway, such as ASIS International, the American Society of Civil Engineers, and the Community Resilience System Initiative. This influx of new members and ideas further boosted the diversity and depth of the Task Force and has increased the utility of the updated *Guide*. The RIDR Task Force met in the spring of 2010 in a day-long kick-off workshop and then held regular conference calls over several months to review, comment, and incorporate ideas and inputs into successive drafts. The Task Force re-convened to assess progress on the *Guide* with the broader TISP membership and interested organizations on December 7, 2010 in Grapevine Texas at the TISP Annual Infrastructure and Regional Resilience Conference. The final draft underwent a broad stakeholder review and comment before completion by the Task Force and publication.

About TISP

TISP was created shortly following the tragic events of September 11, 2001 by 11 professional and technical organizations and federal agencies. A non-profit partnership, TISP serves as a national asset to facilitate dialogue on domestic infrastructure security and all hazards disaster resilience issues and offers sources of technical support and comment on public policy related to the security of the nation's built environment. TISP today has a diverse membership representing nearly two million individuals and firms involved in the planning, design, construction, and operation of infrastructure. This growing membership includes local, regional, state, federal, and foreign agencies; professional associations and industry trade groups; engineering, architecture, and construction firms; codes and standards organizations; educational institutions and universities; planners and economic developers; infrastructure owners and operators; manufacturers and other providers of products and services whose main purpose is related to security and resiliency of the nation's built environment.

Ensuring the Guide is Usable and Used

Before undertaking the revision of the original *Guide*, TISP polled its members and *Guide* users to ask what they most appreciated about it and wanted to see in the updated version. Characteristics most cited were the *Guide's* simplicity, readability, and short, check-list format. They also wanted access to resources and expertise that could help operationalize the *Guide*. There is a wealth of policies, approaches, plans, tools, technologies and other capabilities that are available and can be utilized for this purpose. Many of these capabilities have been developed by U.S. federal agencies and other national and international government organizations, as well as state and local agencies, the private sector, and non-profits.

TISP Activities to Operationalize and Help Sustain the Resilience Improvement Process

To assist users, TISP as noted previously, is providing a supporting *RDR Guide Toolkit* on the TISP website that will link to the websites of a wide range of associations, government agencies, academic institutions and other organizations. Other TISP assistance includes:

- Identifying and helping users develop and disseminate information on plans, procedures, methodologies, tools and technologies to increase *Guide* utility;
- Undertaking multi-stakeholder pilot projects to apply *Guide* recommended courses of actions;
- Sponsoring meetings where users and interested organizations can further their regional disaster resilience knowledge and expertise.

TISP Collaboration with Government Partners. TISP also works with federal agencies to facilitate implementation of those activities in the *Guide* that require federal technical assistance and funds or state and local government leadership. A goal of TISP is to assist government partners to identify those activities that require national level attention.

A Dynamic Document. The *Guide* is meant to be a dynamic "living document," which will be revised and further augmented to accommodate increased understanding of vulnerabilities and associated infrastructure interdependencies, consequences of impacts, requirements, and solutions. A subsequent edition will be produced by TISP in 2016 or sooner if TISP members and *Guide* users see it as needed.

Purpose and Scope

The *Guide* is intended to provide practitioners and experts from government, the private sector and other interested organizations with a tested holistic approach, framework, and guidance to develop and implement a flexible and dynamic Action Plan to improve the resilience of their organization, community or region for all-hazards incidents and disasters. Toward this end, the *Guide* provides recommendations that can be incorporated into an Action Plan for short ("low-hanging fruit"), medium, and longer-term activities that build upon existing capabilities to address resilience needs.

The *Guide* also provides a tool to design and operationalize an ongoing regional resilience strategy through a year-long collaborative, stakeholder-driven process. This Action Planning process:

- Encompasses all elements of the *disaster life cycle*—prevention, protection, response, recovery/long-term restoration, and risk-based mitigation.
- Addresses communications and information sharing, business and operational continuity, logistics, supply chains, resource issues, human factors, public education/training, and exercises.

- Highlights infrastructure interdependencies, a fundamental determinant of disaster resilience that factors into all its aspects.

- Covers all hazards natural and manmade, including cyber threats, aging/deteriorating infrastructures, agricultural, technological, and environmental incidents and disasters, weapons of mass destruction, pandemics, and other major health events.

- Incentivizes cross-sector, multi-jurisdiction, and cross-discipline collaboration and cooperation and lays the foundation for lasting public-private partnerships to enhance regional resilience.

Key Definitions

Following are definitions for key terms that are used throughout the 2011 *Regional Disaster Resilience Guide.* These terms currently do not have universally agreed definitions and have different meanings for organizations, sectors, and disciplines. The policy foundation for disaster resilience is only now evolving. Thus, consistent with the goal to have the *Guide* meet the needs of the broad stakeholder constituency, these definitions are crafted in simple language using common terminology to accommodate diverse perspectives. ***(See Appendix D for a Glossary of additional common terms used in the Guide and useful in understanding disaster resilience.)***

In the context of the *Guide*:

- ***Disaster Resilience*** refers to the capability to prepare for, prevent, protect against, respond or mitigate any anticipated or unexpected significant threat or event, including terrorist attacks, and to rapidly recover and reconstitute critical assets, operations, and services with minimum damage and disruption to public health and safety, the economy, environment, and national security.

- A ***community*** is defined as a group of stakeholders with some form of commonality, whether that be background, interest, performance of a particular function, geographical region (including and not limited to a village, municipality, state or province, or nation), or where shared institutions and culture exist. Communities may cross physical and political borders at local, state, regional, or national levels.

- A ***region*** is an area that is recognized as such by its stakeholder organizations. A region can be a single or multi-jurisdiction area, portion of a state (or province), or may span national borders. Regions have accepted cultural characteristics and geographic boundaries and tend to coincide with the service areas of the infrastructures that serve them. A region may be comprised of multiple communities.

- The ***private sector*** is comprised of diverse for-profit and non-profit organizations and resources not under government ownership.

- ***Key stakeholders*** include individuals, private and public sector organizations, community groups and institutions, and other organizations that:
  - Face challenges in an event or disaster;

- Have responsibilities in emergency preparedness, operations, and management;
- Play major roles in providing the essential services and products that underpin the economic vitality of a community or region, the health and safety of its citizens, and support national security.

♦ ***Critical infrastructures*** include assets, systems, and networks, both physical and virtual, that support communities and regions, and which are so vital that if destroyed or incapacitated would disrupt the security, economy, health, safety, or welfare of the public. Critical infrastructure may cross political boundaries and may be manmade (such as structures, energy, water, transportation, and communication systems), natural (such as surface or ground water resources), or virtual (such as cyber, electronic data, and information systems).

♦ ***Infrastructure Interdependencies*** refers to the physical and virtual linkages and connectivity among critical infrastructures and other essential service providers, including supply chains. Interdependencies have the potential to cause disruptions under certain conditions that can impact multiple infrastructures, affecting essential government services, businesses, and individuals in an entire region with far-reaching health and human safety, economic, societal, environmental, and national security consequences. Interdependencies can exist at multiple levels of increasing complexity and extend beyond a community, a state, and nations.

♦ ***All hazards*** refer to any significant threat or event—natural or manmade. This includes natural disasters, system failures, accidents, technological disasters, infrastructure deterioration, and malevolent acts.

♦ ***Risk Management*** is the process of identifying, analyzing, assessing, and then selecting and evaluating, and implementing strategies for maximizing resilience within limited resources.

♦ ***Mitigation*** involves implementing measures prior to, during, or after an incident to reduce the likelihood of its occurrence, reoccurrence, and/or its consequences.

Fundamental Principles Underlying the *Guide*

The *Guide* and the regional disaster resilience planning process it outlines are based on the following fundamental principles that are grouped below in five broad resilience requirement categories:

1. Holistic Approach that Addresses Infrastructure Interdependencies

- *A holistic, regional, disaster life cycle approach that addresses prevention, protection, preparedness, mitigation, response and recovery/long-term restoration is essential* to assure that organizations, communities, regions, states/provinces and nations can withstand disasters of all types, particularly extreme events.

- *From the grassroots to global levels, infrastructures are increasingly complex and interconnected, resulting in physical and cyber vulnerabilities that are only just beginning to be understood.* Public and private sector organizations are becoming increasingly aware of infrastructure interdependencies. However, there is a great need to broaden the

understanding of the extent and effects of these interdependencies on organizations' responsibilities, operations, and business practices, particularly regarding large-scale and/or long-term disruptions.

- *Disaster resilience requires a holistic, all-hazards regional approach* that covers natural disasters of all types: human error, systems failures, pandemics, and malevolent acts, including those involving cyber systems and chemical, biological, radiological, nuclear, and high yield explosive weapons.

- *Infrastructure assets, systems, and networks, and the interdependent supply chains and resources that enable their operation, are only as resilient as the region in which they are located* because of infrastructure dependencies and interdependencies.

2. Cross-Sector, Multi-Jurisdiction Collaboration through Public- Private Partnerships

- *Regional resilience rests at the grassroots level* with local government and key stakeholder organizations in partnership with state and federal government. The federal role is primarily to provide resources and assistance to localities and states consistent with policy and legal mandates.

- *Creation of regional public-private partnerships is necessary to bring key stakeholders together to build trust, foster information sharing and coordination; identify and assess vulnerabilities and other resilience needs;* and to develop and implement improvements. Such partnerships should include all levels of government; utilities and other service providers; businesses essential to localities for goods, services and jobs, including manufacturers, producers, processors, and distributors of important commodities and products); non-profits, including social service organizations; community institutions (e.g., schools, faith-based and ethnic organizations); and academic institutions.

3. Assessment, Planning, and Mitigation for Regional Resilience

- *There has been extensive work already accomplished by local governments, state agencies, and many businesses and other organizations that should be leveraged to work toward regional resilience. At the same time, local, regional, state, and federal disaster management plans need improvement to deal with today's major events and disasters.*

- *Proactive and innovative approaches, training, and exercises, as well as unprecedented cross-jurisdiction collaboration and planning are required.* This is particularly important for local jurisdiction in those states that function through "home rule." This all must be accomplished in cooperation with private sector and other key stakeholders.

- *Development and maintenance of Mutual Assistance Agreements, User Agreements, Memorandums of Understanding, and other types of cooperative arrangements are essential to sound preparedness planning and disaster management.* Such mechanisms enable jurisdictions (localities, states/provinces, and nations), private sector organizations, and other stakeholders to work out in advance of emergencies resource requirements and allocations, security and legal issues, sharing of proprietary information, and cost-reimbursement.

- *Assuring that supply chains can continue delivery of critical products, materials, and components is essential* to disaster resilience and the vitality of the industrial base, which has a direct and profound impact on regional/national economies and national security.

- *The ability of regions to recover expeditiously from disasters is contingent on the resilience of critical services and systems,* both public and private, which may be jeopardized by absence of essential personnel.

- *Security and damage resilience should be built into cyber and physical systems in the development phase* based on assessed risk under multiple high and low probability scenarios.

- *Where useful, codes, standards and guidelines should be applied within and across organizations and jurisdictions* to enhance security and preparedness.

- *Government and key stakeholders should collaborate to develop consistent, practical, flexible approaches and methods to measuring organizational, community, and regional resilience.*

4. Regional Coordinated Incident Management and Decision-Making

- *Determining and effectively coordinating organizational and jurisdictional roles and responsibilities in major events and disasters are essential for regional resilience.* Along these lines, integration of defense assets into regional preparedness in an appropriate manner is necessary to address incidents and disasters that require resources above and beyond those available at the state and local level.

- *An integrated and complementary virtual and physical approach is required to help determine how best to secure and make resilient interdependent infrastructures, assure expeditious response and recovery and improve regional resiliency* to address all-hazards events and disasters. Consequently, there needs to be increased interaction among physical and cyber security personnel, emergency managers and operators to raise awareness of threats and vulnerabilities.

- *The anthrax attacks of October 2001, followed by the 2003 SARS epidemic and the 2009 H1N1* pandemic, *demonstrate the need to incorporate public health with emergency management and practitioners in other functional areas in an holistic approach covering all aspects of resilience*—preparedness, medical and other response and recovery needs to address any all-hazard event or disaster that has significant impacts on health and safety. Such an event will challenge healthcare organizations with dramatic increases in patient load and reductions in available health and medical capacity, while at the same time disrupting critical infrastructures and other essential service providers on which healthcare organizations depend.

- *Managing environmental hazards is integral to regional disaster resilience.* Waste products and toxic holding sites should be considered security risks as well as environmental risks, and taken into account in response and particularly recovery.

- *The private sector has a wealth of available resources and capabilities for resilience* that must be incorporated into regional disaster response and restoration planning and activities. Likewise, non-profit organizations have resources that can provide substantial benefits.

5. Risk Communications, Information Sharing, and Situational Awareness

- *Securing and managing necessary data on infrastructure interdependencies and potential consequences pre-event, during, and after an incident or disaster are essential.* This requires cross-sector cooperation and establishing ways for two-way information sharing to identify, collect, securely store, integrate, analyze, and appropriately exchange information.

- *Clearly expressed, coordinated communications, tailored to different constituencies and needs, are essential* to expedite response and recovery for significant events and disasters. Such mechanisms need be assessed for stakeholder utility and tested frequently to ensure that they meet their objectives, are redundant and resilient.

- *Community institutions, ethnic and faith-based groups, at risk individuals, and the general public must be involved in planning and exercises, with particular focus on education* and awareness of threats, impacts, and local emergency response procedures.

- *The media has a unique and integral role in disaster management,* performing information dissemination and education functions, on occasion as first responders, and as essential stakeholders with operational and business continuity needs. For these reasons, the media need to participate in preparedness planning and exercises.

ACTION PLAN FRAMEWORK: FOCUS AREAS AND PRIORITY ISSUES

The organizing framework for the *Action Plan* outlined in this *Guide* is a set of 14 focus areas with corresponding priority issues that cover the disaster lifecycle. The focus areas, which were identified by the broad stakeholder community and validated by the original TISP *Guide* Task Force in 2006, have been updated, re-evaluated and expanded by the current RIDR Task Force. A detailed list of these focus areas and priority issues is provided in Appendix B of the *Guide*.

- *In developing a regional Action Plan, stakeholders should examine and customize this list to develop their own set of focus areas and priority issues based on their organizational and broader regional concerns and needs.*

This will be accomplished through targeted workshops, surveys and stakeholder focus groups, as described in the next section of this *Guide*, which focuses on the Multi-Step Resilience Process.

Focus Areas

I. Characterization of the Regional All-Hazards Threat Environment

II. Infrastructure Dependencies and Interdependencies Identification and Associated Significant Vulnerabilities and Consequences for Regional Resilience

III. Regional Resilience Roles, Responsibilities, Authorities, and Decision-Making

IV. Risk Management

V. Alert and Warning, Two-Way Information Sharing, and Situational Awareness

VI. Regional Response Challenges

VII. Recovery and Long-Term Restoration Challenges

VIII. Continuity of Operations and Business

IX. Specialized Sector-Specific Regional Disaster Resilience Needs—Cyber Security, Process Control, and IT Systems, Transportation, Energy, Water and Wastewater Systems, Dams and Levees, Hospitals and Healthcare, and Air and Seaport resilience.

X. Human Factors, Community Issues and Education

XI. Legal and Liability Issues

XII. Public Information and Risk Communications, including Media

XIII. Exercises and Training

XIV. Determining Regional Resilience Financial and Other Resource Needs

MULTI-STEP REGIONAL RESILIENCE PROCESS

Developing an Action Plan and sustaining a continual regional resilience improvement process are accomplished through a systematic, incremental approach based on a multi-step process. This process has been utilized by regional organizations, states, and localities in different regions of the United States and in Canada over the past decade.

The process is designed to bring together key regional stakeholders to collectively raise awareness of infrastructure interdependencies and disaster preparedness gaps, and to develop a roadmap of activities to address these needs. The process entails:

- Setting up and convening a cross-sector, multi-disciplinary work group of key stakeholder organizations; holding a kick-off meeting, an educational workshop, and a tabletop exercise; and conducting a survey, focus groups, and interviews, as well as open source research to develop a baseline understanding of capabilities, findings, and needs.

- Integrating this information into a stakeholder-coordinated Action Plan using the following template to identify short-term, medium-term, and long-term improvement activities.

Following is the process outlined in eight steps. However, it can be tailored to fit regional stakeholder needs with additional or less steps as required. It is designed to enable regions to utilize existing collaborative mechanisms and initiatives, "piggy-back" on local and state exercise programs, and leverage already existing best practices and solutions. Once completed, the process, including the public-private partnership it builds through developing the Action Plan, provides a regional test-bed to undertake activities with support from federal agencies, private sector, and other sources.

The Multi-Step Process

Step 1	**Identify and convene core experts, emergency management, public health, and other government agencies and private and non-profit stakeholders to be part of a work group to provide oversight and direction for the Action Plan development through meetings and conference calls.** Multi-member organizations, such as Chambers of Commerce, Councils of Government, and non-profit associations should be recruited to assist with this effort. This core group of 30-50 organizations will become the de facto steering group that will lead the resilience initiative. The workgroup should represent major utilities; key local, state, and regional federal government organizations (including defense installations); businesses; nonprofits; and academic and community institutions. Associations that represent broad organizational memberships should be invited. (For those regions that already have existing collaborative mechanisms, it is important to ensure all key stakeholders are represented. See the TISP *RDR Guide Toolkit* on the TISP website for a *Key Stakeholder Identification Template*.)

Step 2	**Develop and conduct one to two educational/training workshops to allow stakeholders to explore significant issues and provide guidance and insights from experts on priority issues for incorporation into the Action Plan.** The workshop(s) also should enable participants to share and identify mutual goals and priority concerns and examine current emergency plans, roles, and responsibilities; and ideas for solutions to identified shortfalls. Infrastructure interdependencies should be a major focus. The number of attendees may range from 100-200 representatives of regional public-private sector organizations. A primary goal of the workshops is to develop an understanding of regional interdependencies and establish a trusted collaborative network to advance organizational, community, and regional resilience.
Step 3	**Conduct a baseline assessment (gap analysis) assessing existing resilience and response capabilities and recovery needs.** This can be accomplished using open source information, a stakeholder survey, focus groups, and interviews. The Gap Analysis should cover the focus areas and priority issues identified by the participating stakeholders. *(This step should be kept simple, as it can be labor and time intensive, depending on the size of the region and the extent of preparedness capabilities.)*
Step 4	**Develop the initial draft Action Plan framework** from results of the preceding activities using the stakeholder-validated focus areas and priority issues.
Step 5	**Plan and conduct a tabletop exercise with a scenario selected and designed by the stakeholder work group members to illuminate gaps or areas for improvement in the Action Plan.** ***This is an essential requirement for the Action Plan.*** The tabletop is not a conventional exercise and does not test a plan, rather enables stakeholders to explore and discuss vulnerabilities and consequences in a trusted environment using a scenario they themselves develop through a facilitated process of conference calls and a few face-to-face meetings. The exercise also helps generate interest and enthusiasm to make necessary resilience improvements.
Step 6	**Hold a post-exercise Action Plan Development Workshop** to enable stakeholders to examine and prioritize findings and recommendations in the exercise report and information from other relevant activities for incorporation into the Action Plan.
Step 7	**Coordinate and finalize the Action Plan with the core stakeholder group.**
Step 8	**Develop an Action Plan Implementation Strategy** of prioritized activities that includes lead and participating organizations for respective projects, creation of work groups to define project requirements, determine milestones, funding requirements, and sources of technical and other assistance. *(See the TISP RDR Guide Toolkit for an Action Plan Implementation Template that can be used for this purpose.)*

The above process can take a year to two years, depending availability of resources and whether a region already has an organized public-private partnership and/or well-developed disaster preparedness capabilities. *Note: The process benefits significantly from having a dedicated facilitating entity that can perform the outreach, organizing and administrative functions*

necessary to convene the stakeholders and assist them to undertake the Action Planning activities. This entity can be a chamber of commerce, council of governments, a non-profit association or some other regional organization that can convene cross-sector/multi-jurisdiction stakeholders.

Important Considerations in Developing an Action Plan

- The language used in producing the Action Plan and in documents supporting other activities in the multi-step process (e.g., workshop invitations and agendas, tabletop exercise scenario, educational backgrounders, etc.) should be in common, non-technical language and without acronyms. Because the majority of the stakeholders will be private sector or representatives or community groups of different functional areas and cultures, terminology and procedural documents typically used by government for training and exercises should be avoided or made "stakeholder friendly."

- Coordination of successive drafts of support documents for the multi-step process and the evolving Action Plan is crucial to a successful outcome, as is ensuring the process, including the events, meets the perceived needs of the key stakeholders. Stakeholders must feel they have a "stake" in, and ownership of the process and the Action Plan or they will not invest staff time and continue to actively participate.

- In some cases, the activities recommended in the Action Plan may have already been undertaken by localities and states or provinces, or stakeholder organizations in other regions or nations, including international organizations. These "best practices" should be identified and leveraged where possible to help avoid "recreating the wheel" and to expedite progress in implementing the Action Plan.

- Most of the activities in the Action Plan will require involvement by multiple organizations and many longer-term projects may require federal collaboration with regional stakeholders to provide technical expertise and funding.

- Potential lead and contributing organizations for each of the recommended activities likely will not be immediately specified upon completion of the Action Plan. Also, Action Plan activities may not be initially prioritized. Project leads and "partner" organizations, determination of priority activities, and detailed requirements for each activity will be determined by local jurisdictions with the key stakeholders according to their own timetable and available resources.

- Implementation of Action Plan activities will depend on availability of resources and stakeholder goals and interests, which may change for a variety of reasons over time.

DEVELOPING THE ACTION PLAN

I. Characterization of the Regional All-Hazards Threat Environment

Priority Issues: *Defining the magnitude of threats in an interdependent age (economic and environmental impacts, major loss of life, and impacts to public health and security); priority all-hazards threats (high probability/high impact events, low probability/high impact events); un-anticipated significant events; level of key stakeholder understanding of pandemics and chemical, radiological/nuclear threats.*

Needs:

- Better understanding of and ability to rank in terms of significance all-hazards threats, taking into account infrastructure interdependencies.

Recommended Actions

Short-Term

- Identify potential physical, cyber, economic, health-related, or environmental threats, either directly to the region or indirectly through interdependencies, taking into account, where possible, unexpected events.

Medium-term

- Undertake a regional threat assessment to prioritize all-hazards threats and factor into regional and organizational continuity and mitigation plans.

Long-term

- Develop a "Regional Continuity Plan" centered on interdependencies and comprehensive in focus that includes all jurisdictions and covers all hazards. This Regional Continuity Plan will incorporate and be synchronized and compatible with existing local and state disaster preparedness, public health and management plans.

II. Infrastructure Dependencies and Interdependencies Identification and Associated Significant Vulnerabilities and Consequences

Priority Issues: *Identification and prioritization of critical assets, vulnerabilities and preparedness gaps—sector-specific and threat-specific; assessments of potential and cascading impacts, including impediments to response and recovery; development of the assessment tools and expertise necessary; ensuring confidentially of proprietary and sensitive data.*

Needs:

- Greater awareness and understanding of dependencies and interdependencies-related vulnerabilities and consequences—economic, health and safety, environmental, societal, and security and what this means for creating resilient regions, communities, organizations, and individuals in a major incident or disaster.

- Upgraded and new tools and methodological approaches for use at the local level that can assess impacts, including restoration costs, of interdependencies and associated vulnerabilities under steady-state conditions and under all-hazards scenarios.

- Regional infrastructure risk assessments focusing on high-risk areas and interdependencies impacts assessments of evacuations and sheltering in place plans under different scenarios.

- Interdependencies assessment tools to better analyze the impacts of pandemics and other significant health-related events.

- Understanding of interdependencies–related restoration needs in a regional disruption, e.g., mitigation strategies, priorities, sequencing, work-arounds, and time lines.

- Ways to raise awareness of organizations of their dependency upon supply chains and IT-related resources to maintain critical operations and to prepare for and execute incident response and recovery plans.

- Incorporation of interdependencies into risk assessments, emergency management, and business continuity plans.

- Information for key stakeholders on the impacts of prolonged electric power disruptions and rolling blackouts on interdependent infrastructures.

- Integration of emergency management, public health, physical security and cyber security interests and functions in interdependencies analysis.

- Increased understanding of cross-national border interdependencies for critical infrastructure services, supply chains, and trade.

- Increased understanding of worldwide dependencies and vulnerabilities associated with the use of the Internet for trade and communication.

- Development of improved modeling and simulation capabilities at universities and research institutions to enable quantitative and qualitative assessments related to infrastructure interdependencies-related issues and decision points.

- Interdependencies-focused regional exercises and related training.

Recommended Actions:

Short -Term

- Create or strengthen public-private sector partnerships focused on regional preparedness with the goal of sharing information, gaining greater understanding of regional interdependencies, building trust, and mutual preparedness planning and project implementation.

- Develop a series of regional tabletop exercises to enable stakeholders to further drill down on priority challenges posed by infrastructure interdependencies.

- Hold workshops focusing on target areas where further understanding of interdependencies is required (e.g., energy, transportation, water and wastewater systems, evacuations, healthcare and health communications, and IT systems, etc.).

- Provide stakeholders with an infrastructure interdependencies inventory template that can be used by organizations in-house to enable mapping physical and virtual interdependencies.

- Establish a regional cross-sector interdependencies work group to develop requirements for sharing high-level interdependencies-related information, utilizing information fusion centers.

- Develop a web-based, lessons-learned database for key stakeholders to capture and share knowledge from regional exercises and training.

Medium-term

- Undertake a regional resilience economic impact study focusing on priority scenarios and incorporating interdependencies considerations.

- Revise and improve existing preparedness and disaster management plans to address interdependencies.

- Examine evacuation and sheltering or shelter-in-place plans to assure they are realistic, taking regional interdependencies into account.

- For scenarios that would require lengthy recovery, develop a strategy for long-term sheltering needs that identifies potential sites and how to provide basic services to these sites for extended periods.

- Leverage existing transportation modeling and interdependencies analysis capabilities to develop an evacuation assessment system to assist in evacuation decision-making.

- Identify interdependencies-related economic and health and human safety impacts of security measures that may be put in place during a disruption or attack (e.g., closing ports, interstates, tunnels, airports, bridges or borders) to assess how these activities could complicate response and recovery activities.

- Create incentives for academic studies to assess and understand cross-national border and global interdependencies, vulnerabilities, and consequences that affect business continuity and the broader regional economy.

Long-term

- Identify and build on existing interdependencies assessment tools to evaluate health/safety, environmental, societal, and economic impacts from high-priority scenarios, and identify preparedness gaps and potential cost-effective mitigation options.

- Develop modeling capabilities to better understand the impact of pandemics, other bio, chemical and radiological events on critical infrastructure interdependencies, accounting for physical, virtual (cyber), and human dimensions.

- Develop, using available capabilities, an interdependencies analysis system—for mapping, visualizing and analyzing interdependencies that includes procedures for organizations to provide agreed high-level information.

- Develop a means to provide a secure, virtual, database to "house" contributing organizations' information with agreed security safeguards and legal provisions regarding unauthorized disclosure of information.

- Develop and evaluate through a pilot project an integrated analysis capability (a "toolset" of models and systems) that can be used at the local level to assess and provide cost-effective protection and mitigation decisions regarding interdependent infrastructures and organizations for use during preparedness planning, response and restoration.

- Provide incentives for private and public sector and non-profit stakeholders to undertake interdependency-focused vulnerability assessments and share information, as appropriate.

- Utilize H1N1 pandemic lessons learned and other findings from events with high health impacts to upgrade local and state plans and undertake mitigation activities to improve regional heath resilience

III. Regional Resilience Roles, Responsibilities, Authorities, and Decision-Making

Priority Issues: *Organizational structures for effective preparedness, response and recovery/restoration; decision-making—cross-jurisdiction, cross-sector, cross-discipline; home rule, cultural, and other challenges; authorities, legal, and regulatory, issues.*

Needs:

- An effective regional multi-jurisdictional organizational incident command/area management structure with a well-defined decision-making processes for response and for recovery.

- Improved coordination of command and control-related issues in a regional disaster that includes federal (civilian and defense), state, local agencies, private sector, and non-profits.

- More clarity on roles and responsibilities of government (civilian and defense), private sector, and other key stakeholders in a regional disaster.

- Integration of defense facilities and assets in regional preparedness planning (pre-event as well as post-event).

- Information on how defense assets will support and interact with civilian government and private sector organizations where these assets could be required.

- Better understanding of lines of authority among federal and local government law enforcement entities.

Recommended Actions:

Short-term

- Hold regional workshops on incident management (physical and cyber) and on the National Incident Management System (NIMS).

- Set up a working group of key stakeholder representatives to discuss and delineate roles and responsibilities of government authorities at all levels and private sector and other stakeholders.

Medium-term

- Incorporate into public health and hospital contingency planning coordinated procedures to deal with incidences or disasters in which the large number of casualties may exceed the surge capacity of hospitals that remain in operation.

- Develop as necessary memorandums of understanding, mutual assistance pacts and other cooperative agreements, including cross-state and national borders.

- Incorporate into a regional exercise program drills to explore roles and responsibilities and include key public and private sector stakeholders, including relevant federal agencies, components of those agencies, and defense entities. Incorporate lessons learned into preparedness plans.

Long-term

- Build upon existing emergency and public health plans and activities to expand and improve regional incident management and broader regional response and recovery, taking into account federal, state, local government roles and responsibilities and incorporating key private sector, non-profit, and community stakeholders.

IV. Risk Management

Priority Issues: *Cost-effective pre-event preparedness and post-event prevention, protection and mitigation; guidelines and standards; backup/redundant systems, remote operations; reconstruction and rebuilding to achieve "new normal"; determining financial and personnel resources required to assure critical functions and operations; availability of IT technical expertise and other personnel shortages.*

Needs:

- A regional risk assessment capability to:
  - predict accurate and comprehensive consequences to a full spectrum of threats over a wide range of time scales;
  - address infrastructure dependencies and interdependencies;
  - cover health and public safety, environmental, societal, and economic impacts, including destabilizing various markets and re-establishing new forms of business;
  - enable informed decision-making on resilience alternatives.
- Identification of federal and other government and private sector/non-profit risk assessment capabilities that can be customized for communities and regions and ways to make these capabilities available to local users.
- Inventory of current protection and mitigation capabilities in use or in the planning stage, including their costs, benefits, and risks.
- Improved ways to identify and prioritize critical assets and facilities.
- Access to low or no-cost technical expertise for risk assessment for small business and non-profits.
- Detection, monitoring and sensor systems, and mitigation technologies.
- Improved ways to communicate risk information to multiple audiences (e.g., policy and decision makers, private sector stakeholders, and the general public).

Recommended Actions:

Short-term

- Determine risk and resilience-based criteria to use to identify critical assets and facilities within the context of regional needs.
- Identify existing capabilities and sources of expertise and other support that can be utilized to undertake a regional risk assessment

- Develop a series of targeted scenario-based regional workshops to gain greater information to support a regional risk assessment and enlist stakeholder participation.

Medium-term

- Undertake a regional threat assessment that quantitatively and qualitatively ranks critical infrastructure and other essential community assets in terms of risk to public health and safety, societal well-being, the environment, and economy, taking interdependencies into account.

Long-term

- Develop a regional all-hazards risk assessment.

- Develop or adapt existing analysis tools to examine the impacts of risk management decisions on regional resilience.

V. Alert and Warning, Two-Way Information Sharing and Situational Awareness

Priority Issues: *Focus on local to federal and cross-sector levels; potential mechanisms, including traditional and social media; process issues—collection, storage, integration, analysis, dissemination and related security and proprietary data concerns; utilization of state and municipal information fusion centers in all-hazards resilience; alert and warning/notifications; messaging to schools and other institutions with significant populations, data collection capabilities (availability, including international information; collection, coordination, dissemination; IT Systems reliability, resilience, and security; telecommuting, including "last mile issue" and teleconferencing issues; HIPAA restrictions on individual health information.*

Needs:

- Assessment of the effectiveness of alert procedures and systems, including what information needs to be conveyed, how to convey it, and to what organizations and individuals, and how it will be coordinated and disseminated, ideally from a central focal point.

- Well-defined "triggers" for emergency alerts and activities for various scenarios.

- Improved procedures and mechanisms to facilitate information sharing with the business community on resilience-related issues.

- An operational regional all-hazards two-way information-sharing capability among government agencies with the broader stakeholder community.

- Determination of the role of regional and state fusion centers in information sharing, along with the roles of other key contributors to an information sharing system.

- How to involve the media in an appropriate manner in training and exercises for all-hazards incidents and disasters pre-event and in providing situational awareness during emergency response.

Recommended Action:

Short -Term

- Create or utilize an existing work group of appropriate local government and key stakeholders to discuss and determine realistic triggers for emergency alerts and activities for different scenarios.

Medium-Term

- Evaluate regional alert capabilities and identify ways to improve alert information coordination and dissemination.

- Leverage work to date and additional capabilities to develop an operational regional all-hazards two-way information-sharing capability among government agencies and the broader stakeholder community that utilizes the regional and/or state fusion centers. As part of this effort, delineate the role of the fusion center in information sharing, along with the roles of other key contributors.

- Create or leverage an existing work group of appropriate local government and key stakeholder representatives to develop a media outreach and engagement strategy focused on disaster resilience.

- Incorporate communications and critical IT resilience into public and private stakeholder continuity plans, including testing of telecommuting capabilities by staff and investigation into telecommuting alternatives.

Long-Term

- Creation of a program to develop an information exchange system to provide better monitoring, collection, assessment, and reporting of a the range of data necessary during a disaster or major event and a situational awareness capability to facilitate incident/disaster response.

VI. Regional Response Challenges

Priority Issues: *Evacuations; providing sheltering short-term, including non-traditional sheltering alternatives; infrastructure interdependencies impacts that can complicate response; assuring essential disaster lifeline resources—food, water, fuel, medical supplies, etc.; identifying and certifying response and other essential workers for site access; assuring hospital and healthcare surge capacity; at risk populations—assisted living residents, non-English speaking groups, the homeless, prisons, economically stressed individuals and families, and other "at risk" populations; animals and livestock; mortuary issues; communicating with responders, key*

stakeholders, business community and general public; access to personal protective equipment; prioritized distribution of vaccinations/anti-virals, other medical/hygiene supplies, and related needs; determination of essential personnel for anti-virals; lab analysis capabilities; disaster sheltering during a pandemic or other unconventional bio-event; school closure/daycare issues; business closures; event cancellations; social distancing; travel restrictions—local, domestic, and international; quarantines; insurance issues; national border-crossing issues; disinfection/ decontamination and related issues; individual and family resilience need; pet care issues; security for vaccine distribution, hospitals, grocery stores and pharmacies; mutual aid agreements; resource requirements and management; logistics and supplies availability; cooperation, coordination, including cross-state and cross-national border, on plans, activities.

Needs:

- A regional evacuation plan that could move large numbers of individuals from homes and businesses in a chaotic situation of transportation gridlock, power outages, damaged buildings and structures, and limited communications.

- Provisions for sheltering large numbers of individuals, including long-term sheltering, and a strategy to support displaced individuals.

- Strategy for enhanced outreach, education, and awareness on response procedures, including on evacuations and sheltering under certain scenarios and provisions for "special populations", including tribal nations and individuals in nursing homes and assisted care facilities and prisons.

- Procedures for certification/credentialing of medical/healthcare and other essential personnel to enable them to assist in medical response or regain access to their place of work.

- Review and further expansion of mutual assistance agreements among hospitals and localities and among private sector organizations and non-profits, including with organizations outside the potential disaster impact region, in other jurisdictions or cross-national borders.

- Improved cross-jurisdiction coordination to address home rule issues.

- Improved plans and procedures to ensure vaccine availability and distribution, availability of staff, and access to laboratory health data.

- More focus on preparedness for bio, chemical or radiological attacks or technological disasters, including assessments of the impacts from these types of events on infrastructures and other essential services, associated interdependencies and economic and societal consequences.

- A strategy to incorporate local media into response activities.

- Incorporation of regional and national defense assets in preparedness planning and disaster management.

- A strategy for identifying volunteers available to assist in response and a mechanism and procedures for training, certifying, and incorporating them into emergency planning, including exercises and drills.

- Inclusion of private sector resources along with government assets in a regional disaster response resource inventory system.

- Coordination of local emergency response and business continuity plans of key stakeholders, including non-profits and community institutions.

- Virtual integration of local Emergency Operations Centers in a region and/or creation of a physical regional EOC that includes private sector and other stakeholder representatives.

- Updating and testing existing formal and informal cooperative agreements or mutual understandings for response and recovery activities.

- Dedicated channels for stakeholders to report to government agencies during regional emergencies to prevent inundation by requests for status reports.

- A "yellow pages"—a regularly updated resource directory of disaster response/recovery points-of-contact, including "who does what." Should include logistics and supply components for crucial items such as fuel supply and distribution.

- Protocols for secure response information sharing and nondisclosure agreements.

- Communications disruption contingency plans and exercises and targeted drills to test communications systems under emergency conditions.

- Tabletop and field exercises to test evacuation and sheltering procedures.

- A common terminology to bridge the gap among security, emergency management and IT communities.

- Routine inclusion of private sector and community organizations with government in preparedness planning.

- Training for private sector organizations in the National Incident Management System (NIMS), that is tailored to business continuity plans.

- Procedures to expedite clearances for appropriate private sector responders and healthcare workers and to credential essential personnel who need to travel and have access to sites during emergencies.

- Emergency response contracts for key activities that state/local governments can pre-negotiate and set in place in advance of an event.

- Inclusion in preparedness plans of community institutions and organizations that serve at risk populations.

Recommended Actions:

Short-term

- Determine optimal criteria for an effective regional multi-jurisdictional organizational incident command/area management structure for response that integrates public health with emergency management and other necessary expertise; assess the current incident command structure against these criteria, and identify areas of improvement.

- Develop and conduct evacuation planning workshops with scenarios to assess current evacuation plans for realistic timelines and effective procedures.

- Determine long-term sheltering needs (e.g., location options, housing, provision of essential services, costs, etc.) and incorporate into regional preparedness planning.

- Determine procedures for certification/credentialing of emergency, medical/healthcare, utility, and other essential personnel to enable them to assist in response or regain access to their place of work.

- Undertake a survey of current mutual assistance agreements with organizations outside the potential disaster impact region, including cross-national borders.

- Develop a strategy to incorporate local media in response activities under certain scenarios.

Medium-Term

- Harmonize cross-jurisdiction emergency management and public heath plans to mitigate policy differences that can result in conflicting procedures and public information.

- Assess pandemic influenza vaccine distribution challenges and public information impacts and develop/improve procedures to assure effective and coordinated distribution and administering of vaccines across local jurisdictions.

- Create and conduct targeted workshops and exercises that focus on communication, information sharing, and on roles and responsibilities.

- Examine state laws related to social distancing and other preventative measures during a pandemic.

- Develop a region-wide outreach, education, and awareness strategy on response procedures, including on evacuations and sheltering, for "special populations," including tribal nations and individuals in nursing homes and assisted care facilities and prisons.

- Work with regional and national defense assets to identify what capabilities would be available and in what timeframe during response and recovery, and how to incorporate these assets into preparedness planning and exercises.

- Develop procedures for incorporating volunteers into emergency planning, including exercises and drills.

- Develop additional alternate care facilities throughout the region to reduce the hospital surge burden.

- Identify, assess, catalogue, and incorporate potentially necessary private sector assets into a regional disaster resource inventory system.

- Develop an emergency backup communications systems inventory and assessment with recommendations for mitigation measures using extreme disaster needs as the baseline.

- Establishment of a regional emergency operations center linking regional government, utilities, and other key stakeholder EOCs and the state EOC.

- Create a forum to enable emergency management and security personnel to meet with their counterparts in customer and service provider organizations to share information on disaster management plans in a secure environment.

- Review and where needed create mutual assistance agreements among jurisdictions, private and public sector organizations or among civilian and regional defense facilities.

- Include key private sector stakeholders, non-profits and community organizations in exercises and other preparedness planning activities.

- Assess the needs of community institutions and facilities, (e.g., schools, nursing homes) and of disabled and other at risk populations during a large-scale disaster.

- Identify changes to, or creation of, "Good Samaritan Laws" to facilitate private-public sector coordination/cooperation.

Long-term

- Develop a multi-year exercise strategy of tabletops and field exercises to test government and private sector response procedures and cooperation and identify gaps and potential corrective actions.

- Establish an alternate regional EOC that would be able to replace a regional EOC displaced in an emergency.

- Development of a coordinated response resource management strategy for regional emergencies that involves federal agencies (including defense) and key stakeholders and centralizes planning for relief supplies, food, water, clothing and shelter, including temporary housing; such a strategy would also include transportation to evacuate threatened areas and to transport relief workers, law enforcement and first responders, and utility repair crews.

VII. Recovery and Long-Term Restoration Challenges

Priority Issues: *Planning for recovery and restoration; restoration management structure; roles and missions—federal, state, local, private sector, and community; decision-making cross-jurisdiction, cross-sector, cross-discipline; prioritization of service restoration; resource requirements and management; debris removal / hazardous materials handling; damage assessment, inspection and certification, resources, and processes; effects of environmental degradation; long-term housing needs; support for displaced individuals; assuring regional economic resilience—restoring housing, businesses, schools, faith-based facilities; pre and post-event mitigation challenges for design, construction, reconstruction, detection, monitoring, and decontamination; and regulatory and legal constraints.*

Needs:

- An effective regional organizational structure for recovery and long-term restoration after a major event or disaster with a well-defined process that involves the stakeholder organizations necessary to make informed decisions on priority issues, taking into account health and safety, economic, environmental, social, and political considerations.

- An integrated regional resource management plan for recovery and restoration in large-scale disasters that includes how government (civilian and defense) and private sector and nonprofit personnel, equipment, and other resources could be accessed and secured quickly.

- Ways to circumvent procedural, bureaucratic, and political issues to acquire critical resources, e.g., mobile communications and emergency power generators, emergency back-up equipment, and critical components; temporary housing, food, water, and medicines.

- Procedures for long-term economic restoration, including which agencies will have lead roles in recovery activities, how to involve the private sector and what mechanism would be set up to oversee these activities. (Activities will involve priorities such as debris cleanup and removal, pipeline safety issues, hazardous materials clean up, and availability of dumpsters for waste material, debris, and spoiled food.)

- An inventory of the types of post-disaster recovery assistance that could be made available to localities, the private sector and other stakeholders, including federal help (civilian and defense) for recovery.

- Assurance of adequate stockpiles of fuel, generators, waste management, and medical supplies and sustenance for hospitals, elder care, schools, etc., to meet needs in an unexpected regional disruption lasting more than 72 hours.

- Plans for temporary and longer-term housing and other provisions for "displaced persons", including prison inmates, addicts, mentally handicapped people, illiterate and homeless individuals, the impoverished, and alcoholics. These plans should take into account the impact on cities and localities that must accommodate a large influx of displaced individuals.

- Regional consequence assessments of impacts to critical infrastructures and essential services based on likely scenarios to more accurately gauge potential recovery and restoration needs.

- An operational capability for recovery/long-term restoration that includes:
  - A mechanism and process for sharing information on potential resources and determining their availability, including the amount and location available from different jurisdictions, the private sector, and non-profits.
  - Procedures for acquisition of expertise needed for inspections and certification of food, agriculture, utilities, and other service providers before these facilities can return to operation.
- MOUs and MOAs among regional stakeholders, jurisdictions, and states on resources to be supplied and under what conditions and how reimbursement will be handled.
- Study of psychological, social, and economic factors that can affect post-event business retention and sustainability.
- Incentives and rewards to keep small businesses operating and encourage them to return to the region if they have left.
- Education for private sector organizations about how federal and state disaster response resources and/or reimbursements are requested and allocated.
- Coordinating plans of charitable and other non-profit institutions in providing essential services and supplies.
- Strategies and procedures to deal with volunteers and unsolicited donations.

Recommended Actions:

Short-term

- Build upon existing local jurisdiction recovery plans to develop an effective regional organizational structure for recovery and long-term restoration with a well-defined decision-making process that involves key stakeholder organizations.
- Identify and develop a database of the types of post-disaster recovery assistance that can be made available to localities, the private sector and other stakeholders, including federal help (civilian and defense) for recovery.

Medium-Term

- Create a process for information sharing about potential resources that might be available from the private sector and non-profits and include procedures that address compensation and liability issues.
- Develop and incorporate into a regional continuity plan procedures for resource acquisition and management that include expertise needed for inspections and certification of food, agriculture, utilities, and other essential services.

- Undertake an assessment of regional psychological, social, and economic factors that can affect post-event business retention and sustainability.

- Identify incentives to keep small businesses operating after a regional incident or disaster, and to return to the region if they have left; determine what legal or policy provisions may need to be developed or changed.

- Creation and implementation of a plan to stockpile, or provide access to electric power generators and other emergency back-up equipment and supplies.

- Assess inventories of supplies in schools, hospitals, nursing homes, other community facilities, and prisons to ascertain what additional resources would be needed for major events or disasters.

- Inventory federal resources that are accessible to public and private sector organizations for recovery, and incorporate into a brochure and post on local jurisdiction websites.

- Develop a volunteer management system that addresses contributions of non-profits and other groups and pre-certifies and credentials experts (healthcare, damage assessment, builders and other contractors) to assist in a disaster recovery.

- Develop a template for a regional disaster restoration plan for use by businesses, non-profit and public sector organizations to supplement continuity plans.

- Undertake a survey of local government agencies, utilities, and other key service providers and commercial enterprises to determine expected equipment and personnel availability and needs in a prolonged regional disruption.

Long-Term

- Leverage work already accomplished on restoration to assess long-term physical, economic, environmental, and societal impacts, with focus on bio, chemical, and radiological attacks or incidents.

- Develop a disaster management resource inventory with analytic capabilities on public, private sector, and non-profit resources available for restoration, including subject matter and technical experts, manpower, vehicles, food, water/ice, pharmaceutical supplies, temporary housing, equipment, and services, with point of contact information.

VIII. Continuity of Operations and Business

Priority Issues: *Pre-event preparedness, mitigation—remote siting, back-up systems and building in redundancies, preservation of vital records, etc.; operational challenges associated with loss of services/damage to assets; assuring essential staff; providing access to information and situational awareness; addressing challenges for small and medium businesses; identification of essential operations and business activities; assessment of potential disruptions to operational and business services, including logistics, suppliers, customers, availability of truck drivers,*

warehouses, etc.; business liaison with Emergency Operations Center; involvement of the broad range of businesses in unconventional threat preparedness activities; notification and provision of employee information, training of employees, and other human resource issues; and testing of continuity plans and procedures.

Needs:

- Accelerated and expanded local government outreach to and training for area utilities, businesses and other organizations on how to improve continuity to take into account regional resilience challenges.

- Assistance to small and medium enterprises and other organizations lacking resources and expertise to understand requirements for self-sufficiency for 72 hours or more in a major regional emergency.

- A template or process for businesses, hospitals, academic, and community institutions to assess their critical operations, essential needs and availability of critical assets to assure continuity of operations and business.

- Means to better understand and analyze supply chain vulnerabilities and disruption impacts associated with interdependencies.

- Cost-effective security and mitigation measures to assure supply chains and just-in-time deliveries.

- Exercises and drills to test organizational continuity plans that involve key service providers and suppliers.

- Involvement of businesses, such as retail, manufacturing, distribution, and service organizations in regional preparedness planning and exercises.

- Information and best practices for businesses and other organizations on dealing with workforce policy issues in an event or disaster.

- Cost-effective backup and redundant systems, remote data storage, and other mitigation measures.

Recommended Actions

Short -Term

- Develop a strategy for expanded outreach and awareness for area businesses on regional resilience that covers the issues of particular concern to small and medium-sized enterprises, including on how to upgrade operational and business continuity plans and where to obtain information for this purpose.

- Assess and improve current continuity plan templates for businesses, healthcare facilities and other organizations, taking interdependencies into account.

- Create an on-line "All-Hazards Regional Resilience Lessons Learned" resource that provides information for businesses and other interested organizations on planning, tools, and other best practices that can be used to improve operational and business continuity.

- Develop with business stakeholders an economic resilience risk mitigation strategy as part of a broader regional continuity plan that includes actions to address business continuity challenges and identify ways to make and incentivize improvements.

- Create templates for in-house interdependencies workshops and exercises that can be utilized by businesses to test plans and procedures.

- Develop cooperative arrangements with key suppliers and customers that address security and resiliency needs for supply chains.

Medium-term

- Improve methodologies and approaches for organizational vulnerabilities and risk assessments that take interdependencies into account.

- Adopt management strategies to assure availably of and access to critical equipment, materials, components, and products, including from offshore sources.

- Identify challenges regarding confidentiality and legal constraints to collaboration with supply chain organizations and ways to address these issues.

- Undertake outreach and education of key suppliers on interdependencies and conduct on-site "total system" assessments.

Long-term

- Develop processes and tools to identify and assess supply chain vulnerabilities/ interdependencies and disruption impacts; also risk assessment and decision support systems to determine optimal mitigation measures.

- Develop a model process to establish continuous resilience improvement through benchmarking and metrics.

IX. Specialized Sector-Specific and Other Regional Disaster Resilience Needs

(Covers unique sector needs and recommended actions not referenced in other focus areas)

A. Assuring Regional Cyber Security and IT System Resilience *(phone, cellular, Internet-based systems)*

Needs:

- Educational tools and approaches to:

- Increase the knowledge of key stakeholder organizations about new and emerging cyber threats and vulnerabilities to operational and business systems, including supervisory control and data acquisition (SCADA) and process control systems;
- Address misconceptions about the technical capabilities of computer networks to withstand attacks and recover quickly, and the challenges of resorting to manual operations;
- Enhance incident response and mitigation.

- Ways to share information on cyber threats and incidents for regional cyber disruption management.
- Development of criteria on when to stand up an Emergency Operations Center for a cyber attack.
- Technologies for intrusion detection and protection.
- Mobile backup and alternative computer and communications capabilities (local, long distance and wireless) in significant disasters.
- Development of plans to restore electronic and communications systems expeditiously among critical communications systems/providers.
- Ongoing information security and resilience training for all sector stakeholders.

Recommended Actions:

Short-term

- Assessment of communications and critical IT vulnerability to prolonged disruptions under certain scenarios and improvement of plans and capabilities to assure these essential functions continue or can be expeditiously restored.
- Undertake testing of mass telecommuting by staff to enable remote working after a major incident or disaster.
- Identify alternatives to telecommuting that can be utilized by businesses and organizations to continue operations post-disaster.
- Determine cyber incident threshold criteria for stand up of Emergency Operations Centers.
- Develop and conduct cyber security and incident response awareness workshops customized for stakeholder personnel, media, and the general public.
- Provide cyber security and resilience guidelines for gov, businesses and other organizations.
- Incorporate cyber security and resilience challenges into regional and targeted exercises.

- Create a regional cyber security and resilience all-hazards coordination group of key stakeholders to raise awareness of threats, incidents and challenges, share information and focus on resilience activities.

- Develop a list of volunteer IT security experts that can offer their time and expertise to help small organizations increase their information security operations and awareness.

- Establish data backup and off-site storage procedures to minimize impacts from cyber attacks or other events and assist in rapid reconstitution.

Medium-term

- Create a cyber security and regional resilience incident management system that enables key stakeholders to communicate on threats and to address significant disruptions.

Long-term

- Develop or improve existing assessment tools for impacts on communications and IT systems from events and disasters, including weapons of mass destruction attacks and electromagnetic pulse (EMP).

- Improve methods and technologies to harden IT systems to better withstand catastrophic events, as well as to better prevent and thwart cyber attacks.

B. Transportation Regional Resilience *(road, including freight, shipping and mass transit); rail; maritime and air transport systems; bridges and tunnels)*

Needs:

- Increased local government and broader stakeholder awareness of transportation-related vulnerabilities, associated interdependencies and regional public safety and economic consequences for all hazards, including aging and deteriorating infrastructure.

- Greater coordination on response and recovery from transportation-related incidents among transportation, emergency management, public works, and other local officials within and across jurisdictions.

- Regional transportation emergency response and recovery planning for all-hazards events that would significantly disrupt transportation.

- A regional all-hazards transportation mitigation strategy.

- A public information strategy addressing the needs of regional businesses, utilities, healthcare facilities and the general public for prolonged transportation disruptions.

- Information on what federal resources (waivers, technical assistance, funding) is available to assist with major damage or loss of critical transportation assets, such as a bridge.

- Transportation emergency exercises that bring together transportation public and private sector representatives with emergency managers, public health officials, key stakeholders, and community groups.

- Transportation disruption management assessment tools that can demonstrate the impacts on traffic congestion and neighborhood arterial roads of alternative routing.

Recommended Actions:

Short-term

- Identify available federal, state, and local, and private sector resources available to assist with recovery from an event or disaster involving damage or destruction of critical transportation assets; determine the process and time it would take to access these resources.

- Inclusion of public and private sector transportation representatives in federal, state, and local Emergency Operation Centers and in fusion centers as essential partners in cross-sector information sharing.

- Development of a transportation disruption exercise program that enables transportation, public works, emergency management, public health, and key stakeholders to raise awareness and test and upgrade jurisdictional and regional transportation emergency plans and procedures.

Medium-term

- Undertake an assessment of transportation-related vulnerabilities, associated interdependencies and regional public safety and economic consequences for all hazards, including aging and deteriorating infrastructure across all modes and upgrade jurisdictional and organizational emergency and continuity plans and capabilities.

- Develop transportation emergency public information procedures as part of a regional disaster resilience outreach and education strategy that identifies target community businesses, groups, and the media, and utilizes town hall meetings and surveys to understand transportation needs and expectations.

- Establish a web-based system to provide information to shippers, delivery services, and drivers on closures and alternate routes;

- Identification of risk-based transportation resilience mitigation measures, including research into hardening techniques for transportation assets to withstand catastrophic events.

Long-term

- Creation of a regional transportation emergency response and recovery plan as part of a broader all-hazards regional continuity plan that includes:
  - Procedures for coordination and sharing of transportation emergency and continuity plans among jurisdictions and transportation operators;

- An incident command structure and rescue and recovery procedures for bridge or tunnel structural damage or failures;
- Transportation emergency response procedures to assure fire and emergency vehicles can reach those in need and transport victims to hospitals;
- Pre-event designation of a command post or posts for bridge or tunnel failures and for emergency response boats and helicopters that can make water rescues;
- A single point for transportation disruption-related alert and warning and ongoing information to the public using communications mechanisms that provide information on road, bridge or tunnel closures and detours and alternate routing in languages reflecting the ethnic makeup of the region;
- Provisions for ensuring emergency back-up power for traffic management signs and cameras, posting rerouting signage, debris removal, and securing adequate personnel for directing traffic (e.g., law enforcement, trained volunteers, and in major disasters, National Guard);
- Backup plans for loss of mass transit routes and assets that take into account public needs, shortage of drivers, transit-related union issues, etc.
- Transportation management plans to deal with the loss of a bridge or tunnel that could require in some cases years to rebuild;
- Resilience measures for dispersed, isolated transportation infrastructure and contingency plans (back-up systems or system redundancy, and other mitigation measures) to address damage or destruction;
- Supply chain mitigation measures to work around transportation disruptions (for example, a central two-way communication resource for freight carriers, movement limits on certain types of freight to off-peak hours, use of media to distribute information and notifications to truckers, creation of a travel time Mapquest function on the Internet, suspending local jurisdiction noise ordinances to enable trucks to use certain roadways or undertake deliveries at night, lifting weight restrictions for trucks temporarily, creating additional HOV lanes or having HOV only in all lanes within a certain time of day, putting in a special use lane for transit and freight, and banning parking on streets).

- Development and enhancement of existing transportation management models to enable decision-making on alternative routing to deal with all-hazards transportation emergencies.

C. Energy Regional Resilience—*electric power, natural gas, fuels availability, distribution, and storage; data collection, information sharing, response, recovery challenges, and energy risk mitigation.*

Needs:

- Raising awareness and understanding of the regional energy infrastructure and energy related all-hazards threats, needs, priorities, and challenges.

- Increased knowledge of regional energy-related interdependencies (production, supply and distribution/delivery).

- Enhanced cooperation and coordination among key energy resilience stakeholders—local and state officials, energy providers and related organizations, critical infrastructures and essential service providers and other significant customers (including community and academic institutions and commercial enterprises).

- Determining information sharing and situational awareness needs for regional energy disruptions.

- Effective planning to assure effective regional energy emergency response and recovery.

- A regional approach to energy investment (in infrastructure upgrades, renewable energy, and smart grid and other advanced technologies) that strengthens energy resilience.

Recommended Activities:

Short-term

- Study of the regional energy profile examining characteristics of energy usage, major utilities and related service territories; sources of electricity; location of the transmission and distribution infrastructure (e.g., major electric lines/substations, major gas pipelines/storage facilities); primary suppliers of petroleum fuels, storage facilities, refineries, and/or major pipelines.

- Assessment of significant all-hazards threats to the energy infrastructure/provision of services that could result in prolonged outages and range of consequences.

Medium-term

- Identification and assessment of energy and broader infrastructure interdependencies, associated vulnerabilities and consequences of prolonged outages and disruptions.

- Development or improvement of a regional energy assurance/resilience plan as part of a regional continuity plan in partnership with relevant agencies, energy service providers, key infrastructure and major business owners and operators, state energy assurance office and other relevant state agencies, the U.S. Department of Energy and other federal agencies.

Long-term

- Development of a regional mitigation/energy resilience strategy that includes pre and post-event prevention, protection, and mitigation resource needs to determine investments for:
  - Mitigation, smart grid, energy efficiency, renewable energy sources, and green technologies;
  - Resources needed for energy exercises and training, backup/redundant systems; remote operations, and feasibility and security studies;

- Reconstruction and rebuilding energy infrastructure;
- Financial and personnel resources required for resilient regional energy functions and operations.

D. Water and Wastewater Systems Regional Resilience—*threats, vulnerabilities/ interdependencies and potential impacts, prevention and mitigation, and risk communications.*

Needs:

- Improved understanding of potential all-hazards disasters and events on water and waste water assets, systems, and operations that take infrastructure interdependencies into account.
- Enhanced contaminant detection, vulnerability and consequence assessment tools for water/wastewater systems.
- Regional all-hazards risk assessment and mitigation strategy focusing on water and wastewater systems that address realistic timelines to reconstitute services under different scenarios and optimal mitigation measures.
- Local government and key stakeholder awareness and access to tools, technologies, and approaches that can assess infrastructure, community, and regional water and wastewater systems resilience.
- Incorporation into business and operational continuity, local jurisdiction and regional planning of procedures and measures to improve all-hazards water and wastewater resilience.
- Public outreach and awareness strategy on water and wastewater resilience challenges that addresses the needs of the broad stakeholder community and includes alert and warning procedures and education on potential water contamination and service disruptions issues.
- Mutual assistance agreements among water utilities and local jurisdictions to deal with prolonged water services disruptions.
- Pilot projects and regional exercises to build on existing water/wastewater systems regional resilience.
- Improved assessment capabilities and better coordination of federal, state, and local water quality protection activities.
- Improved communication and coordination among utilities and federal, state, and local officials and agencies to provide needed information about threats, including on chemical, biological, and radiological contaminants that could impact water and wastewater systems.

Recommended Actions:

Short-term

- A regional risk assessment initiative that examines the range of threats to water and wastewater systems, vulnerabilities, and health and safety, environmental and economic consequences with focus on interdependencies. The study should include a baseline assessment of available capabilities, including detection, monitoring, decision-support systems, policies, plans and procedures and utilize workshops and tabletop exercises that enable utility and local government personnel, private sector and other community stakeholders to examine preparedness, response and particularly recovery needs.

- Identification of ways to strengthen communication and coordination among utilities and federal, state, and local officials on water system-related resilience issues.

Medium-term

- Upgrading of emergency response and continuity plans by water utilities, businesses, and other regional stakeholders using lessons learned from the regional risk assessment.

- Creation or expansion of existing mutual assistance agreements among water utilities and local jurisdictions to deal with prolonged water services disruptions.

- Development of a public outreach and awareness campaign that addresses water systems prolonged disruptions that is customized to target groups—commercial facilities, utilities, healthcare facilities, at need populations and residents. The strategy should include alert and warning procedures and effective guidance for "Do Not Drink and Do Not Use" orders and on decontamination and disposal of contaminated materials.

Long-term

- Develop and conduct an ongoing program of regional workshops and pilot projects focusing on improving water and wastewater systems resilience.

- Continued enhancement of vulnerability and consequence assessment tools, protective measures for SCADA systems and administrative networks, increased information for chemical, biological, and radiological contaminants that could affect water systems, and real time, on line monitoring for dangerous contaminants.

- Continued expansion and increased coordination of activities by federal, state, local government, and commercial laboratories to improve capabilities to analyze for chemical, biological, and radiological contaminants in drinking water through standardized protocols and procedures.

- Identification of existing government-developed, private sector and non-profit tools, technologies and best practices that local stakeholders can utilize to assess infrastructure, community, and regional water and wastewater systems resilience.

- Development of a collaborative stakeholder-based approach to design metrics for water and wastewater resilience.

E. Dam and Levee Regional Resilience—*dam and levee-related flood threat, consequence assessment, and mitigation; alert and warning, multi-agency information-sharing and related public information issues.*

Needs:

- Inventory and characterization of regional dams and levees.
- Assessment of potential flood threats associated with dam/levees and impacts—health, safety, economic, environmental, and societal.
- Holistic regional risk assessment and mitigation strategy focused on dam and levee associated all hazards scenarios.
- Improved regional inundation maps.
- Greater understanding of potential earthquake impacts to regional dams and levees.
- Development or enhancement of existing dam and levee emergency action plans.
- Improved coordination among local dam and levee owners and operators, local government and key stakeholder organizations on emergency plans and procedures.
- Improved interagency (federal, state, local) communication and coordination on potential dam-related flooding challenges.
- Risk communication strategy to inform public on dam and levee flood risks.
- Improved situational awareness of dam and levee-related flood events.
- Effective and expeditious alert and warning for dam-related flood evacuation.
- Standardized criteria for assessing dam and levee-related risk levels.
- Tools and mitigation techniques and technologies that dam and levee owners and operators and localities can use to improve regional dam and levee resilience (detecting, monitoring, assessing structural integrity issues, and preventing or mitigating damage or failure).
- Methodology for measuring dam and levee-associated regional resilience.

Recommended Actions:

Short-term

- Assess existing alert and warning protocols, procedures, processes, including federal, state, and local coordination, for dam and levee-related flood threats and identify necessary improvements.

- Undertake a public information capabilities gap analysis for flood threats.

Medium-term

- Undertake an inventory and study of the regional dam and levee system to assess potential all-hazards flood scenarios, to include information on seepage, detection and monitoring methods, potential breaching scenarios, protection projects, code enforcement, and a prioritized list of potential consequences and mitigation options.

- Development of an initial regional flood risk mitigation strategy that would be part of a regional contingency plan focusing on scenarios and that identifies options and resources to secure, harden, and/or relocate critical assets; remove hazardous materials from potential inundation areas; and identify necessary legal and regulatory waivers.

- Development or upgrading of existing flood inundation maps.

- Development of a regional risk communication strategy that identifies information needs of target audiences, and procedures, mechanisms and tools for outreach and communication.

Long-term

- Development of a comprehensive regional flood emergency management plan that includes information on flooding impacts and associated infrastructure interdependencies, details trigger events, describes state and federal agency authorities and required actions for local jurisdictions and regional stakeholders at different flow conditions during the course of a flood.

- Development of a dam and levee threat/response regional situational awareness capability.

- Identification of federal and other tools, technologies and best practices that dam and levee owners and operators and localities can use to improve regional dam and levee resilience, to include detection, monitoring and assessing structural integrity issues and preventing or mitigating damage or failure.

- Development of standardized criteria for assessing risk and measuring dam and levee-associated regional resilience.

F. Hospitals and Healthcare Resilience—*hospital capacity issues; staff availability; availability of pharmaceuticals, medical and other materials; hospital-related public safety and security issues; alternative care facilities; availability of essential services, power, and fuel, including for backup generators, ambulances, etc.; critical vendor availability*

(elevator and equipment maintenance, technical assistance, food service, janitorial services, emergency medical services, power generators).

Needs:

- Improved healthcare plans for access to staff and technical expertise to assure adequate surge/patient resourcing capacity to deal with a major event or a disaster.
- Improved vaccine distribution and effective public information on vaccine availability and access.
- Identification, recruitment, training and credentialing of volunteer health experts to augment healthcare workers in a significant emergency.
- Ensuring part-time and full-time surge personnel and volunteers to augment regular response staff and relieve pressure on healthcare providers.
- Outreach to healthcare managers on, and development of, cooperative agreements to share staff in emergencies.
- Inclusion by healthcare organizations in continuity plans in collaboration with vendors on their expected needs for supplies of specialized equipment, technical assistance, and other resources, and how these resources would be prioritized and allocated to specific hospitals and other healthcare facilities.
- Greater understanding of direct and indirect infrastructure interdependencies that affect hospitals and other healthcare providers in different disaster scenarios with focus on disruptions that could curtail operations or require healthcare facility evacuation and closure.
- Assessment of hospital security needs and availability of security assets during major events and particularly those that may produce prolonged disruptions or cause public panic.
- An agreed approach for identification and certification of healthcare staff and medical emergency personnel to move across local jurisdictions in a regional emergency.
- MOUs and agreements with other regions and states, as well as cross-border to share healthcare resources.
- Capabilities to provide better monitoring, information collection, assessment and reporting on:
  - Laboratory-confirmed significant illness and disease hospitalizations and deaths to fulfill local, state, and federal reporting requirements, as well as information on suspected deaths and intensive care unit admissions;
  - Emergency department and outpatient facility visits for influenza-like illness and tracking trends in disease activity by age group.
- Information on the status of staff, equipment, supplies and other resources needed by hospitals and medical facilities to meet surge requirements.

- Information on absenteeism levels at schools and producing school absenteeism reports for public health and school district authorities.

- An ongoing surveillance reporting capability for healthcare, public health, and key stakeholders during periods of disease outbreaks.

- Awareness for healthcare providers and the public on clinical signs and symptoms, diagnosis, treatment, and infection control measures.

- A regional health information exchange capability that includes an electronic case reporting system for healthcare institutions.

Recommended Actions:

Short -Term

- Develop or leverage an existing template for hospitals and other medical facilities to inventory pre-event/monitor post-event essential assets and resources that are necessary for surge capacity under specific scenarios.

- Develop and conduct a workshop bringing together local public health officials and regional healthcare facility managers to discuss barriers to sharing staff in regional emergencies, and what strategies, including pre-event agreements could be put in place to facilitate this.

- Develop an assessment that inventories existing emergency healthcare-related memorandums of understanding and agreements and includes recommendations to expand them, and identifies other areas for new agreements to enhance regional health resilience.

Medium-Term

- Create a regional volunteer health worker program of volunteers categorized by expertise, focus and projected assigned responsibilities during an event or disaster. Provide necessary levels of training and certification for providing certain types of emergency services.

- Undertake a study that assesses estimated numbers and types of trauma cases in different scenarios, triage strategies, projected necessary healthcare capabilities, gaps and potential solutions.

- Creation of a work group of local public health, healthcare organization representatives and key stakeholders involved in the supply of essential healthcare resources to develop a decision-making process to prioritize allocations of critical equipment and resources to healthcare facilities during a regional incident or disaster.

- Survey hospitals and other large medical facilities on their security needs under various scenarios and make or improve existing arrangements with local law enforcement and security firms to provide resources if necessary.

- Build on state and local activities on certification procedures for first responders and other essential personnel to cover heath-related personnel.

Long-Term

- Develop a risk assessment system that assesses hospital and healthcare facility vulnerabilities and associated interdependencies and consequences for different disaster scenarios.

- Examine and if necessary develop policies to ensure that hospitals collaborate with other healthcare providers and supply chain organizations to develop and exercise business continuity plans.

- Determine alternative medical standard of care strategies and decision-making procedures.

- Creation of a program to develop:
  - An electronic health resilience information exchange system to provide better monitoring, information collection, assessment and reporting of a wide range of health-related information necessary during a pandemic or other major health-related event;
  - A regional health resilience situational awareness capability to facilitate incident/disaster response and recovery.

G. Air and Seaport Resilience—*all hazards threats, vulnerabilities, and associated consequences and risk-based prevention and interdependencies, mitigation measures, metrics for sector regional resilience.*

Needs:

- Identification of airport and seaport critical operational and support assets to include facilities, infrastructure, equipment and other goods and services, including organizations involved in transportation services (freight, people, and mail).

- Assessment of all hazards threats that could impact air and seaports, potential vulnerabilities and associated interdependencies, and health and safety, environmental, and economic consequences on port operations and services, customers and supply chains, and the overall regional economy.

- Incorporation of airport and seaport officials into regional emergency planning and incident management.

- Airport and seaport stakeholder collaborative groups focusing on resilience and security that include local, state, and federal agencies, utilities, and commercial organizations (hotels, restaurants, retailers etc.) that support port operations.

- Outreach and education strategy for airport and seaport key stakeholders on all-hazards threats that could disrupt port operations.

- Port emergency and continuity of operations plans that are coordinated with and incorporated into plans of local jurisdictions and major port stakeholders and customer organizations.

- Port communications that are integrated with local law enforcement, security, emergency management, public health, state and major municipal fusion centers and relevant federal agencies (e.g., Coast Guard, military facilities).

- Identification of potential prevention and mitigation approaches, tools, and technologies to improve port resilience.

- Workshops, exercises, and drills that bring together port, local, state, federal officials, port stakeholder community, regional utilities and other relevant stakeholders.

Recommended Activities:

Short-term

- Creation or expansion of existing airport and seaport stakeholder collaborative groups focusing on resilience and security to include key public and private organizations involved in port operations and services.

- Incorporate airport and seaport emergency and continuity of operations plans into local government and major port stakeholder planning.

- Develop an all-hazards risk communication strategy for the airport and seaport key stakeholder communities and broader regional stakeholders.

- Develop and conduct regional port-focused exercises that bring together relevant government agencies and the port stakeholder community.

Medium-term

- Development of airport and seaport regional resilience risk management strategies as part of a comprehensive regional continuity plan that:
  - Identifies critical operational and support assets;
  - Covers all-hazards threats, vulnerabilities and infrastructure dependencies and interdependencies; impacts on port operations and services and the overall regional economy;
  - Provides for optimal prevention and mitigation approaches, tools, and technologies.

- Enhance coordination and integration of port communications and information sharing with local government, state, and federal civilian and defense agencies and fusion centers.

- Conduct joint training and exercises for airport and seaport officials and local, state, and federal officials to facilitate regional emergency planning, incident management, and response and recovery decision-making.

Long-term

- Undertake airport and seaport prevention and mitigation activities identified in the regional risk management strategy.

X. Human Factors, Community, and Family Issues, and Education

Priority Issues: *Types of societal challenges and needs pre and post disaster; understanding and dealing with psychological impacts; identifying and addressing family assistance needs, at risk populations and ethnic and cultural groups, academic institutions—daycare centers, schools, colleges and universities, and community centers; assuring people return to a region post-disaster—creating the incentives and an acceptance of the need for a "new normal" and willingness to invest in creating it; and developing the necessary outreach and education initiatives.*

Needs:

- Outreach, education, and ways to improve assistance to families and at risk individuals and groups that are unable to access information on preparedness or to afford preventative health measures, medical and psychological care, and long-term sheltering and support associated with incidents or disasters.

- Identification and inclusion in all-hazards preparedness planning and exercises of organizations and groups that provide assistance to families, children, at risk populations and ethnic and cultural groups.

Recommended Actions:

Short-term

- Identification of at risk populations and the non-profit organizations that serve them (families, children and the elderly; ethnic, faith-based and other cultural and special groups).

- An inventory of regional public health and other capabilities that that assist agencies and other organizations representing at risk populations.

- An assessment of the needs of these groups.

Medium-term

- Development of a societal resilience strategy that builds on current public health and non-profit activities, engages these target populations and the non-profit organizations that serve them, and identifies ways to further improve assistance to them. The strategy will include:
  - Identification of points of contact within these groups;
  - Activities to address identified needs;

- An outreach and education program of optimal ways to disseminate information on all-hazards threats, potential consequences, and preparedness actions based on what types of communications and communication channels are most effective for particular groups.
- Integration of these groups into preparedness activities and exercises.

Long-term

- Incorporation of the societal resilience strategy into jurisdiction preparedness and disaster management plans and broader regional continuity plan.
- Ongoing implementation of the comprehensive approach to incorporate a wide range of activities focused on at risk populations, identifying improvements where gaps exist, and incorporate into emergency preparedness, response, and recovery planning.

XI. Legal and Liability Issues

Priority Issues: *For government agencies, businesses—workforce policy issues, e.g., compensation, prolonged absences, social isolation and removal of potentially contagious employees, safe workplace rules, flexible payroll issues, contractual issues, information from/coordination with regulators; privacy issues; ethical issues; union-related issues; liability associated with vaccine distribution and administering.*

Needs:

- A compendium of legal and liability issues associated with disaster preparedness, response, recovery or mitigation for private sector, non-profit, and government organizations.
- Identification of examples of best practices and solutions to workplace issues utilized by stakeholders in other regions.
- Incorporation of procedures to address legal and liability issues into emergency management and continuity of operations/business plans.
- Identification of areas where changes could be made to existing laws and regulations to take into account challenges from significant incidents and disasters.

Recommended Actions:

Short -Term

- Develop and conduct a regional workshop focused on legal/liability issues and policy gaps that impact preparedness and which identifies legislative or other actions that could be taken to lessen these constraints.

Medium-Term

- Develop a hardcopy and on-line brochure of examples of legal and liability issues associated with disaster preparedness, response, recovery, or mitigation for private sector and government organizations. The brochure should also identify best practices to deal with work place-related policy and liability issues.

Long-Term

- Revise or develop new policies and procedures to address legal and liability constraints that adversely affect regional disaster resilience.

XII. Public Information/Risk Communications, including Media

Priority Issues: *Requirements for developing and implementing a coordinated regional approach with focus on different constituency needs: private sector (business and service communities), general public, cultural and other groups; needs and recommended activities related to the media pre and post-disaster.*

Needs:

- A comprehensive regional public information plan for incidents and disasters that covers health and safety and associated preparedness, response, and recovery issues addressing different scenarios.

- A single Internet website for regional emergency preparedness/management and related public health information that provides detailed, clear, consistent, coordinated information.

- A process to assure timely information is provided to the public on vaccine availability and distribution and priority groups for vaccination that takes into account that private sector organizations and the general public have different information needs

- Recognition of the local media as a "first responder" in significant incidents or disasters and a means to communicate critical information and educate the public.

- Assess ways to use the Internet and social networks for outreach and disaster response/ recovery.

- Identification and access to disaster-related open source information that the media can use to gain awareness and better communicate to the public.

- Inclusion of local media in regional and targeted workshops and exercises.

- A vulnerability assessment of the Emergency Broadcast System and other regional warning systems to ensure they are fully reliable.

- A strategy to maintain civil order if critical infrastructure services are disrupted and the opportunity for civil unrest escalates.

- Education at K-12 levels on resilience-related issues.

Recommended Actions:

Short-term

- A disaster public information and communication plan that identifies:
  - The types of information provided,
  - Target audiences, including at risk and other groups,
  - Types of media used,
  - What messages should be conveyed,
  - Designated communicators,
  - What vulnerabilities exist regarding communications systems that could impede information dissemination,
  - Types of educational tools required.

- Development, with selected media, of guidelines on how to utilize the media in large-scale disasters.

- Guides for media on critical infrastructure interdependencies to help them understand the issues, weapons of mass destruction events (nuclear, radiological, bio and chemical), and cyber attacks.

- Refine procedures to provide public service announcements, including developing alternate and redundant ways to inform the public during a regional disaster.

- Creation of a short list of trusted subject matter experts to provide expertise to media under the director of designated public information points-of-contact.

- Conduct a training course on interacting with the media for essential employees in the event of an emergency.

- Undertake a training course for law enforcement personnel on how to deal with civil unrest and panic situations during a disaster.

Medium-term

- Develop a risk communications tool-box (guidelines, procedures, and information to facilitate effective communication of pertinent, all hazards disaster-related information to the public and media; should include a glossary of common terms).

- Develop a comprehensive regional public information strategy for incidents and disasters that covers health and safety and associated preparedness, response and recovery issues addressing different scenarios, identifies target audiences, what information to convey, and how it would be coordinated and disseminated.

- Designate and develop a single regional Internet website for regional emergency preparedness/management and related public health information that provides detailed, clear, consistent, coordinated information with links to local jurisdiction and other relevant websites.

- Creation of a regional Joint Information Center that includes public affairs officers of key public, private sector, and non-profit stakeholder organizations.

Long-term

- Development of a dynamic web-based system to enable key stakeholder personnel to get answers from experts on all-hazards disaster resilience issues.

XIII. Exercises, Education, and Training

Priority Issues: *Target audiences; Incident Command System training for private sector organizations; focus on training from "business" perspective; inclusion of key stakeholder organizations in full-scale exercises; development and documentation of lessons learned from regional and targeted regional exercises, workshops, and other training events; training tools and activities (course curriculum webinars, workshops, train the trainers, etc.), that can be incorporated into regional disaster resilience activities.*

Needs:

- A regional strategy for resilience training and education.

- Educational forums for local media to enable them to better understand the challenges of regional disasters, what to expect from government, utilities and other key stakeholders, and to provide knowledge of local, state and federal disaster plans.

- A multi-year program of tabletop and field exercises that has a regional focus, involves all key stakeholders and selected media, and does not overburden or "exercise to death" local organizations.

- Education for stakeholders, media and legislators on the following:
  - Regional infrastructure interdependencies and their impacts on regional disasters;
  - Impacts of long-term power outages and rolling blackouts;
  - Cyber threats and disruptions;
  - Pandemic flu and other significant health-related threats;
  - Weapon of mass destruction (radiological, nuclear devices, chemical) impacts, response, and recovery issues.

Recommended Actions:

Short-term

- Incorporate in a regional five-year exercise plan at least one tabletop exercise per year that includes the broad key stakeholder community.

- Develop and conduct an educational seminar for local media that includes local government officials to address priority all-hazards disaster scenarios and public communication challenges, including how the media and local government can effectively cooperate to convey information to the public.

- Develop a strategy as part of a broader regional resilience continuity plan for resilience training and education for businesses, community institutions and the general public.

- Develop and conduct targeted workshops to discuss response and restoration for challenging scenarios that will require specialized scientific and technical expertise, for example a chemical, radiological or nuclear incident or bio-attack.

Medium-Term

- Development of tools for educating public officials and citizens on local disaster preparedness and management plans and challenges, e.g., specialized publications, a "trade show" type booth set up outside public meetings to disseminate public information, etc.

- Creation of a public-private exercise planning work group to develop a coordinated multi-year plan of tabletop and field exercises that avoids duplication of effort.

- Develop training courses for the public and media and interested staff of key stakeholders on the impacts of long-term power outages and rolling blackouts; regional infrastructure interdependencies and their impacts; cyber threats and disruptions; and weapons of mass destruction impacts, response, and restoration issues.

- Develop a web-based calendar of homeland security-related events to provide a heads-up to stakeholders on training opportunities and to deconflict event schedules.

Long-term

- Continue regular regional exercises to further broaden interdependencies knowledge at deeper levels and to evaluate new and upgraded plans, procedures, and prevention/mitigation measures.

XIV. Determining Regional Resilience Financial and Other Resource Needs

Priority Issues: *Determining resources needed for pre and post-event protection and mitigation and training and exercises; post disaster funding/reimbursement: federal, state, and local governments; private sector; criteria for assistance, assistance availability, and challenges for*

the private sector; non-profit and community organizations; loans and incentives to small and medium size businesses for disaster preparedness.

Needs:

- Information on disaster assistance available from various federal and state sources with criteria and guidelines for applying.
- Avenues for local jurisdictions to secure funds for pre-event mitigation activities for high-probability, high-consequence threats.
- A disaster assistance mechanism with procedures to enable the collection of funds from non-government sources, including private donations and that can provide vetted, appropriate distribution to businesses that suffer either direct or indirect harm.
- Ways in which government assistance programs for the private sector could be expanded.
- Access to disaster assistance best practices that states, localities, private sector, and non-profit organizations have developed.

Recommended Actions:

Short-term

- Create or utilize an existing work group to explore ways in which government assistance programs can be expanded for the private sector.
- Develop and conduct a targeted workshop that includes relevant federal officials and local government agency and political officials to discuss ways to secure resources (e.g., types of grants, programmatic funds, in-kind, volunteer and other available support) for resilience activities.

Medium-Term

- Develop a brochure (hardcopy and electronic) outlining disaster assistance available from federal and state sources with criteria and guidelines for applying.

Long-Term

- Develop options for a regional assistance non-profit mechanism that can enable the collection of funds from non-government sources, including private donations and that can provide vetted, appropriate distribution to businesses that suffer either direct or indirect harm from incidents or disasters.

ESTABLISHING THE REGIONAL DISASTER RESILIENCE SYSTEM

The *Action Plan* is an initial effort to identify activities that can be undertaken individually and collectively by regional stakeholders to improve disaster resilience. At the same time, the Action Plan provides a checklist and avenue for systematically assessing and upgrading plans, procedures, policies, expertise, protection, mitigation tools and technologies to assist in this effort.

Action Plan Implementation. Once the Action Plan is finalized and validated by the stakeholders, the next steps are to reconvene them to prioritize the activities in the Action Plan to develop a "doable number" of actions that stakeholders wish to undertake and for which funding and/or expertise are available. At the Action Planning Workshop, the stakeholders will also begin to determine which agencies and organizations will be the lead for each of the activities and other organizations that wish to participate in the respective projects. The final step will be to create or utilize existing work groups, committees, or other mechanisms to develop requirements for the respective activities, including a work plan and schedule for project completion.

The coordination and finalization of the Action Plan marks the end of what is the first phase to develop the Regional Disaster Resilience System. The Action Plan is designed to be a dynamic roadmap leading towards enhanced resilience and should be considered an integral element in a continuous improvement process in which lessons learned from events and disasters, as well as results from additional regional tabletops and conventional exercises, workshops and other events are incorporated as new needs with corresponding activities to address them.

The Importance of a Resilience-focused Public-Private Partnership and Facilitating Entity

As noted previously, there should be an existing collaborative arrangement or a public-private partnership created to undertake implementation of the Action Plan. This partnership may well be informal, with membership open to interested key stakeholder organizations and no defined organizational structure. Many government and business organizations for legal or ethical reasons are not able to join in formal agreements with governance systems.

Even more essential to Action Plan implementation is the availability of a facilitating organization or mechanism to reconvene stakeholders, assist in establishing the work groups to develop requirements for Plan activities, and provide basic administrative and logistics support services. This facilitating organization will also help in identifying potential implementation resources—grants and other financial resources, expertise, and tools and technologies that can be leveraged.

Stakeholders may elect to set up this mechanism themselves or a community or regional group or association may take on this role. This mechanism optimally should be an established non-profit able to take in funds from different sources, public and private, for cooperative activities. There are a growing number of diverse resilience-focused public-private partnerships and various models for this type of mechanism across the U.S. and in other nations. In the U.S. alone, there are dozens of these at the multi-state, state, county and local levels. Some large metropolitan areas and states may have multiple collaborations centering on the needs of different communities and groups. All of these collaborations have unique characteristics based on the regions they serve and the interests of the member organizations. Some examples of regional resilience partnerships in the United States at the state and city level include the Pacific NorthWest Economic Region's

Puget Sound Partnership and broader Pacific Northwest Partnership for Regional Infrastructure Security and Resilience (five states and four Canadian provinces and territories), the All-Hazards Consortium (nine Mid-Atlantic states); the Southeast Emergency Response Network (11 Southern states), the Southeast Wisconsin Homeland Security Partnership, the Safeguard Iowa Partnership, the New Jersey Business Force, the State Partnership-Utah, the Alaska Partnership for Infrastructure Protection, and the ReadySanDiego Business Alliance.

MAINTAINING MOMENTUM AND SUSTAINABILITY

There are broad and inter-related challenges to forward progress towards regional resilience once the initial foundation is laid with the stakeholder-validated Action Plan. These challenges center around two big issues:

1. Continuing and sustaining stakeholder enthusiasm and momentum generated by the multi-step process, as well as gaining the necessary support and encouragement from government, private sector, and political leaders;
2. Obtaining resources to undertake implementation of initial Action Plan activities.

These fortunately are surmountable. What is most important is establishing and sustaining a working regional public-private partnership to assist in identifying preparedness shortfalls, validating and prioritizing the Action Plan activities selected for implementation and undertaking individual and collaborative solutions to address these gaps. Also essential is the need to create, within this regional partnership, ways to enable the secure sharing of information, engage multiple organizations in project development, and pool resources from various organizations while avoiding conflict of interest. This will require on the part of local and state governments a flexibility and willingness to give partnership members a say in regional planning, implementation, and funding decisions.

Creating or enhancing an existing public-private partnership with a dedicated part-time facilitator—ideally a community or regional organization in this role—is sufficient. Support from a few key leaders may be all that is necessary, particularly if these include county and municipal emergency management, public health and other key agency officials with disaster resilience missions, and major businesses in the community. Universities and colleges in the region can provide valuable support through providing expertise or venues for meetings and events.

Securing the Necessary Resources

Critical to the success of regional efforts to achieve disaster resilience is the federal government, both civilian and defense, which will need to provide the technical expertise, seed money, and in certain cases, substantial investment for many of the activities in the Action Plan. A key challenge will be determining how to best develop the organizational structure and programs to do this that can supplement traditional state and local funding mechanisms. Few models exist that enable federal dollars to be provided to regional entities. Consequently it is important to that facilitating organizations supporting regional partnerships have non-profit status to allow provision of grants and other government funds for resilience enhancements.

Regarding resources, there are an increasing number of avenues—public program funds and grants, foundation and non-profit resources, and private sector investment. Particularly promising is the new priority focus at the federal level on resilience in the U.S. and by an increasing number of other national governments. *(See the TISP RDR Guide Toolkit website for information and links to useful sources of assistance.)* With access to public seed money for resilience projects, increasingly local industry and business interests are also contributing to these efforts.

At the same time, impediments to providing public funds directly to regional mechanisms need to be overcome through policy changes where necessary. This is significant, because most community resilience improvement activities will have no single lead organization but multiple stakeholders participating. Traditional funding through state and local government may not be available or appropriate where funds and support from multiple sources are involved. Also, state and local governments express concern about not being able to meet "unfunded mandates" from resilience action planning activities.

MEASURING PROGRESS MADE

There is currently considerable focus and discussion among national policy-makers, academicians, and others in the research community on metrics for all hazards resilience. A number of disparate efforts are underway to develop resilience measurement capabilities and metrics, some that focus on infrastructures or based on still evolving regional risk assessment approaches. There also has been much work accomplished over the past decade that can be leveraged—physical and cyber security standards, guidelines, and assessment tools and technologies for infrastructure sectors and facilities.

There are various rationales commonly cited on the need for qualitative and particularly quantitative methodologies and tools for measuring resilience. Measuring resilience would:

- Enable prudent allocation by government and the private sector of scarce resources for research and development of prevention and mitigation solutions;
- Provide facility owners with leverage to obtain lower insurance rates;
- Inspire communities to improve their resilience "level" in order to be "certified resilient" to enable them to attract business investment and new residents.

While these rationales have appeal, as the *RDR Guide* demonstrates, developing an initial baseline understanding of a region's resilience to all-hazard disasters is a complex undertaking requiring a holistic, systematic approach by a broad number of stakeholder organizations. Compounding the problem is that there as yet no general consensus or policy foundation for disaster resilience, nor accepted criteria to determine resilience, or what would constitute an optimal "resilience level." An additional significant complicating factor is that infrastructure interdependencies are only at best understood at superficial levels, as are human behavioral issues during emergencies. Also, there is the dilemma of defining what needs to be measured, for what purpose, how to accomplish this and to do so on a cost-effective basis; also, how disparate, sensitive, and proprietary data

necessary will be collected, stored, assessed, aggregated, and weighted; who will be responsible for assessing it, what tools will be used (or need to be developed) and what resources will be available to support these activities.

Beyond these challenges, measuring disaster resilience requires addressing resilience from the component, asset, and system levels to organizational, community, regional, national, and in some cases global levels. Many organizations may choose not to be involved in developing regional resilience metrics on the basis they are already subject to federal, state, and local regulatory requirements and other standards and guidelines that obligate them to provide safety, reliability and security data. Particularly private sector organizations will not be disposed to provide government or other stakeholders proprietary or sensitive information.

Looking at these hurdles, some experts have suggested that simple criteria could be used to assess resilience levels, for example, the existence of local jurisdiction emergency plans that reference resilience, or conduct of a regional risk assessment, the number of exercises held, existence of a public-private partnership, etc. While these actions indicate that stakeholders have developed a level or awareness and are working together to become more resilient, the actions do not in themselves demonstrate resilience.

In sum, determining realistic, practical and meaningful ways to measure all-hazards disaster resilience is a daunting undertaking that will involve many "players" and will take years to evolve. Subsequent updates of the *RDR Guide* will provide information on measuring regional resilience and metrics as they are developed.

What is Doable in the Near Term

While it is premature to devise ways to measure resilience in quantitative terms, there is a simple, practical, flexible, stakeholder-focused approach to determining progress made—the Regional Disaster Resilience Action Plan developed through the multi-step process.

The Action Plan framework of focus areas and priority issues provides stakeholders with a self-developed broad set of resilience criteria, and the Action Plan activities provide stakeholders with a resilience checklist for what they themselves have determined needs to be accomplished. Thus, progress towards community resilience can be measured in terms of Action Plan activities initiated, in progress or completed. As the Action Plan is augmented with additional needs and remedial activities over the years, it provides a running inventory and status report on the increasing disaster resilience level of a community or region.

BUILDING A CULTURE OF RESILIENCE

Developing disaster resilience is a complex and continuous undertaking. It is made all the more difficult by still-evolving understanding of infrastructure interdependencies and limited analytic capabilities to assess potential threats, associated vulnerabilities and disruption consequences, determine cost-effective protection and mitigation options, and measure progress made. The fact that so many stakeholder organizations have roles and responsibilities or vested interests in disaster resilience adds additional complications and makes multi-jurisdiction, cross-sector and

discipline cooperation and coordination essential. An additional, impediment, as has been noted, is the lack of regional mechanisms that can secure funds and support from multiple sources for resilience projects that have no single responsible or "lead" entity. These issues, however, should not impede localities, states, private enterprises, and other organizations from undertaking the activities in the Action Plan, many of which will fall into the "low-hanging fruit" category.

The greatest challenge will be maintaining forward movement on the Action Plan towards regional disaster resilience. Local governments and other organizations will need to take leadership roles for Plan activities and a proactive approach to retain and expand stakeholder interest and involvement. In-kind support from stakeholder organizations in the form of personnel involvement in regional resilience activities will be a crucial resource. Most key stakeholders are already involved in many volunteer initiatives and activities in addition to their normal professional duties. This means that progress on implementing Action Plan activities will depend on the willingness of people to provide the necessary leadership, enthusiasm, and expertise to move forward.

The Biggest Benefit: Stakeholder Collaboration and Empowerment

The regional resilience system process outlined in the TISP *RDR Guide* has many benefits—bridging cultural differences among community groups and professional disciplines, building relationships and trust, and exploring and uncovering interdependencies-associated and other resilience gaps. The greatest value, however, is that many stakeholders will emerge out of the experience with a sense of ownership of the Action Plan and a willingness to work together in a partnership to address the shortfalls and the improvement activities they have identified. Moreover, some individuals will "self-select" themselves for leadership roles and one or more organizations may step into a facilitating role for a regional partnership. This collaborative arrangement, whether formally constituted or informal, will generate and maintain forward movement and momentum on the Action Plan. It is this partnership that will need to build, maintain, and sustain the continuous process of improvement that increases regional resilience in the years ahead.

APPENDIX A

SUMMARY OF RECOMMENDATIONS

(To Be Provided Upon Guide Completion)

APPENDIX B

FOCUS AREAS AND PRIORITY ISSUES

I. Characterization of the Regional All-Hazards Threat Environment

- Defining the magnitude of threats in an interdependent age (economic, environmental, major loss of life or impacts to public health and security)
- Priority all-hazards threats (particularly high probability/high impact events and low probability/high impact events)
- Unanticipated significant events that may require building in resilience

II. Infrastructure Dependencies and Interdependencies Identification and Associated Significant Vulnerabilities and Consequences for Regional Resilience

- Identification and prioritization of critical assets, interdependencies-related vulnerabilities, and preparedness gaps
  - Critical asset/system specific
  - Sector-specific
  - Threat-specific
- Assessments of potential and cascading impacts on infrastructures and essential services, including impediments to response and recovery
  - Developing the assessment tools and expertise necessary
  - Ensuring confidentially of proprietary and sensitive information regarding infrastructure-related data

III. Regional Resilience Roles, Responsibilities, Authorities, and Decision-Making

- For federal, state and local government organizations; private sector (infrastructures, businesses), political leadership, community institutions and other key stakeholder groups
- Organizational structures for effective preparedness, response, and recovery/restoration—objectives and how to organize
- Decision-making (cross-jurisdiction, cross-sector, cross-discipline)
- Home rule, cultural, and other challenges to regional cooperation
- Authorities, legal, regulatory, and liability issues

IV. Risk Management (cost-effective pre-event preparedness and post-event prevention, protection, and mitigation needs and activities)

- Security/physical protection and prevention measures
- Guidelines and standards
- Backup/redundant systems, remote operations
- Reconstruction and rebuilding to achieve "new normal"
- Determining level of financial and personnel resources required to assure critical functions and operations
- Availability of IT technical expertise and other personnel shortages
- Identification of threats, impacts, and cost-effective prevention, protection, and mitigation alternatives

V. Alert and Warning, Two-Way Information Sharing, and Situational Awareness

- Focus on local to federal and cross-sector levels
- Mechanisms, including both traditional and social media
- Process—collection, storage, integration, analysis, dissemination, and related security and proprietary data issues
- Utilization of state and municipal information fusion centers in all-hazards resilience
- Alert and warning/notifications
- Messaging to schools and other institutions with significant populations
- Data collection capabilities (availability, including international information; collection, coordination, dissemination)
- Information sharing issues (too much/rapidly changing/conflicting information, prioritization, integration of data, standardized approach/use of GIS)
- Healthcare data-related issues
- IT Systems reliability, resilience, and security
- Telecommuting, including "last mile issue" and teleconferencing issues
- HIPAA restrictions on individual health information

VI. Regional Response Challenges

- Evacuations
- Providing sheltering short-term, including non-traditional sheltering alternatives
- Infrastructure interdependencies impacts that can complicate response
- Assuring essential disaster lifeline resources (food, water, fuel, medical, etc.)
- Identifying and certifying response and other essential workers for site access
- Assuring hospital and healthcare surge capacity
- Mutual aid agreements
- At risk populations (assisted living residents, non-English speaking groups, homeless, prisons, economically stressed individuals and families, and other "at risk" populations)
- Prioritized distribution of vaccinations/anti-virals, other medical/hygiene supplies, and related issues
- Determination of essential personnel for anti-virals
- Lab analysis capabilities
- Continued operation of pharmaceutical companies/retailers, grocery stores
- Disaster sheltering during a pandemic or other unconventional event
- School closure/daycare issues
- Business closures
- Event cancellations (e.g., sports events, other)
- Social distancing
- Travel restrictions (local, domestic, international)
- Quarantines (particularly related to air and sea travel)
- Insurance issues
- National border-crossing issues
- Credentialing/certification for access to restricted areas
- Disinfection/decontamination and related issues

- Mass fatalities planning/mortuary-related issues
- Livestock issues
- Individual and family resilience needs
- Pet care issues
- Communicating with responders, critical infrastructures and other essential service providers, business community, and general public
- Security for vaccine distribution in transit and for dispensing organizations on site
- Security for hospitals, grocery stores and pharmacies
- Mutual aid agreements (cross-state and cross-border)
- Availability of emergency managers and first responders
- Resource requirements and management
- Logistics and supplies availability
- Cooperation, coordination, including cross-state and cross-national border, on plans, activities

VII. Recovery and long-Term Restoration Challenges

- Planning for recovery and restoration (overview of lessons learned from events, disasters, and exercises)
- Restoration management structure—what organizations and how organized
- Roles and missions (federal, state, local, private sector, and community)
- Decision-making (cross-jurisdiction, cross-sector, cross-discipline)
- Cooperation, coordination
- Prioritization of service restoration
- Resource requirements and management
- Debris removal/hazardous materials handling
- Damage assessment, inspection and certification resources and processes
- Affects of environmental degradation
- Long-term housing needs

- Support for displaced individuals
- Assuring regional economic resilience (restoring businesses, schools, faith-based facilities, etc.)
- Pre and post-event mitigation challenges for design, construction, reconstruction, decontamination, and regulatory and legal constraints
- Securing government and other types of assistance—developing criteria for assistance, assistance availability and challenges particularly for the private sector

VIII. Continuity of Operations and Business

- Pre-event preparedness, mitigation (remote siting, back-up systems and built-in redundancies, preservation of vital records, etc).
- Operational challenges associated with loss of services/damage to assets
- Assuring essential staff, including technical experts and general workforce
- Assuring access to information and situational awareness
- Addressing challenges for small and medium businesses
- Identification of essential operations and business activities
- Assessment of potential disruptions to operational and business services, including logistics, suppliers, customers, availability of truck drivers, warehouses, etc.
- Business liaison with Emergency Operations Center
- Administrative, budget issues
- Workforce policy issues (compensation, absences, isolation, and removal of potentially contagious employees, safe workplace rules, flexible payroll issues, etc.)
- Assistance to small businesses for contingency planning/continuity of operations
- Involvement of businesses in unconventional threat preparedness activities
- Notification and provision of employee information
- Training of employees
- Testing of continuity plans and procedures

IX. Specialized Sector-Specific and other Regional Disaster Resilience Needs

- Sector-specific needs and recommended actions not referenced in other focus areas addressing:
  - Assuring regional cyber security and IT system resilience (phone, cellular, internet-based systems)
  - Transportation resilience (road, including freight, shipping, and mass transit); rail; maritime, and air transport systems; bridges and tunnels)
  - Energy assurance and resilience (electric power, natural gas, fuels distribution and storage)
  - Water and wastewater systems resilience
  - Dam and levees regional resilience
  - Hospitals and healthcare resilience
  - Air and seaport resilience

X. Human Factors, Community Issues, and Education

- Types of challenges and needs pre and post-disaster
- Understanding and dealing with psychological impacts
- Identifying and addressing family assistance needs
- Education and academic institutions (daycare centers, schools, colleges and universities, libraries, community centers)
- At risk populations and ethnic and cultural groups
- Assuring people return to a region post-disaster — creating the incentives
- Creating an acceptance of the need for a "new normal" and willingness to invest in creating it

XI. Legal and Liability Issues

- For government agencies
- For businesses (employee, insurance, contractual issues, information from/coordination with regulators)
- Privacy issues
- Ethical issues
- Union-related issues
- Liability associated with vaccine distribution and administration

XII. Public Information and Risk Communications, including Media

- Requirements for developing and implementing a coordinated regional approach with focus on different constituency needs: private sector (business and service communities), general public, cultural and other groups
- Separate section on needs and recommended activities to address the media pre and post-disaster

XIII. Exercises and Training

- Target audiences
- ICS training for private sector organizations
- Focus on training from "business" perspective, not government
- Inclusion of private sector organizations in full-scale exercises
- How to develop, conduct, and document lessons learned from regional and targeted regional exercises, workshops, and other training events
- Training tools and activities (course curriculum, webinars, workshops, train the trainers, etc., that can be incorporated into regional disaster resilience activities)

XIV. Determining Regional Resilience Financial and Other Resource Needs

- Assessing capabilities, lessons learned/gaps
- Ascertaining pre and post-event protection and mitigation needs
- Training and exercise resources needed and availability
- Post-disaster funding/reimbursement
  - Federal, state, and local governments
  - Private sector
  - Non-profit and community organizations
  - For implementation of prevention, mitigation, and other health and safety resilience requirements
  - Loans and incentives to small and medium businesses for bio-event preparedness

APPENDIX C

INFRASTRUCTURE INTERDEPENDENCIES BACKGROUNDER

In the past decade across the nation, the critical infrastructures and other essential service providers that enable our communities to thrive and grow have become increasingly interconnected and interdependent. These infrastructures include energy (electric power, natural gas, fuels); telecommunications, transportation (rail, road, maritime); water and water treatment systems; banking and finance; emergency services; government services; hospitals, healthcare, and public health; agriculture and food; commercial facilities; nuclear reactors; materials and waste; dams and levees; manufacturing; chemical facilities; and postal and shipping. To a large degree, this trend towards ever greater linkages has been created by our growing reliance on electronic systems, computer processing and the Internet for managing and operating these infrastructures. This interconnectivity and the resulting interdependencies can exist at multiple levels of increasing complexity and extend beyond a community, a state, and nations, creating unexpected vulnerabilities and significant consequences.

Although emergency and business continuity practitioners are beginning to focus on interdependencies, we remain limited in our understanding of them, the vulnerabilities they create, and how to prevent or lessen their impacts. Disruptions in one infrastructure can cascade, ultimately affecting more than one infrastructure, affecting essential government services, businesses, and individuals in an entire region with far-reaching health and human safety, economic, environmental, and national security consequences.

Examples of Infrastructure Dependencies and Interdependencies

Water and waste water systems, are dependent on a wide range of infrastructures and other essential services, including electric power to run pumps and control systems, petroleum fuels for transportation of repair and maintenance personnel, communications to handle the ordering of chemicals and other supplies and equipment and direct operations, all modes of transportation for supply and shipping, and financial systems to support billing, payments, and other business services. Likewise electric power utilities depend on natural gas, coal, and petroleum to fuel generators, as well as on road and rail transportation to deliver fuels to the generators, water for cooling and to reduce emissions, and telecommunications to monitor system status and system control, e.g., Supervisory Control and Data Acquisition (SCADA) systems and energy management systems.

Similarly, other infrastructures depend on water and electric power and other infrastructure services.

- Computer, process control, telecommunications, and other systems that run infrastructures depend upon water for cooling. Water systems may require electric power for operating pumps and need logistics and transportation for supplying water treatment chemicals.

- Natural gas fuels critical gas-fired generators in the electric power system. Electric power in turn may be required to operate the critical systems that are essential for delivering gas (e.g., control systems, storage operations, and compressor stations).

- A substation in an electrical distribution system can provide electric power to a key telecommunications switching center, and rail transportation depends on electric power for signaling, crossing protection, monitoring, and other terminal operations. Under certain conditions, failure or loss of power in a substation, for example, directly affects operations at a telecommunications switching center.

- The telecommunications center, in turn, supports SCADA systems for natural gas and oil pipelines, as well as electric power, water, and transportation systems that support electric power.

- Agriculture and food processing, warehousing and distribution, and manufacturing are dependent on all the major infrastructures, for example power for processes and refrigeration, communications for shipping and logistic; all modes of transportation for shipping materials and products, and financial systems to support purchasing of materials and sales of goods.

When infrastructure failures occur and repair crews and replacement components are needed, service providers also depend on other infrastructures, including telecommunications/IT, petroleum fuels (for vehicle and emergency generator fuel), road transportation, and, in some cases, rail transportation. Other dependencies, because of their location or exposure to the environment, are not physically linked but are coupled. A common utility corridor that consists of overhead or underground electric power transmission and distribution lines, underground pipelines, and telecommunications cables dramatically illustrates such dependencies. In many instances, multiple infrastructure assets are co-located, for example along bridges, roadways, or in a single location can increase susceptibility to and likelihood of simultaneous outages due to physical hazards, such as a flood, explosion, fire, and earthquake, as well as sabotage.

Another type of dependency can exist in complex systems without a direct link. The failure of a substation, for example, can lead to reconfiguration of the electric network, which, in turn, can overload a similar substation within the system if the demand exceeds capacity. In such cases, a direct link usually does not exist, and the failure occurs only when certain conditions are imposed (e.g., maximum load conditions). Natural hazards, such as earthquakes or extreme weather conditions, clearly show how threats can affect multiple infrastructures at the same time. Such threats also reveal interdependencies that can complicate or delay response and mitigation or recovery of a particular infrastructure from an incident.

Why a Holistic Regional Risk Mitigation Approach is Important

Because these dependencies and interdependencies remain little understood, the emergency management plans of critical infrastructures, other service providers, and businesses are at best adequate to address localized disasters and not major incidents and disasters with regional consequences. These plans do not take into account extensive and prolonged impacts that may include disruption or destruction of critical components, systems, and facilities, causing outages of weeks or months and shortages of supplies, personnel, and capabilities to restore critical

services. Such widespread and prolonged service disruptions can cause huge regional economic and psychological impacts that can significantly diminish commerce and cause the relocation of residents in affected communities. At the same time, economic constraints pose additional challenges for states, localities, and stakeholder organizations, which have limited manpower, funds, and technical expertise to assess all-hazards vulnerabilities from interdependencies, and identify and remedy readiness gaps.

Whether a natural disaster, manmade incident, or pandemic, there is clearly a need for a holistic regional strategy to improve the resilience of our infrastructures and other essential services, as well as the communities and regions that depend upon them. This all-hazards, multi-jurisdiction, cross-sector approach to preparedness and resilience includes detection, prevention, mitigation, response, recovery/restoration, training, exercises, and community outreach. It requires utilities and other service providers to examine external linkages that affect their operational and business continuity. It also necessitates bringing together local public, private, and non-profit stakeholders with state and federal partners in collaboration to share information and understand and address regional vulnerabilities and consequences posed by infrastructure interdependencies.

APPENDIX D

GUIDE TOOLKIT RESOURCE CATEGORIES

1. Templates

2. Tools

3. Plans and Procedures

4. Policies, Guidelines, Standards

5. References and Other Informational Materials

6. Lessons Learned from Events and Disasters, Workshops and Exercises

7. Selected Best Practices

8. Where to Find Additional Help

APPENDIX E

GLOSSARY OF TERMS

All-Hazards: Refers to all conditions, environmental or manmade, that have the potential to cause injury, illness, or death to—or loss of—equipment, infrastructure services, or property; or alternatively causing functional social, economic, or environmental harm.

Asset: Person/staff, structure, facility, information, material, or process that has value.

Bio-Event: Any all-hazard event or disaster that has significant impacts on health and safety.

Business continuity: The ability of an organization to continue to function before, during, and after a disaster.

Capability: The means to accomplish a mission, function, or objective.

Consequence: The effect of an event, incident, or occurrence. Categories of consequence include: public health and safety, economic, psychological, environmental, and national security.

Consequence Assessment: The process of identifying or evaluating the potential or actual effects of an event, incident, or occurrence.

Critical Infrastructure: Includes systems, facilities, and assets so vital that if destroyed or incapacitated would disrupt the security, economy, health, safety, or welfare of the public. Critical infrastructure may cross political boundaries and may be built (such as structures, energy, water, transportation, and communication systems); natural (such as surface or groundwater resources); or virtual (such as cyber, electronic data, and information systems/procedures).

Disaster: An event, expected or unexpected, in which a community's available pertinent resources are expended. It may also occur when the need for resources exceeds availability, and in which a community undergoes severe danger, incurring losses so that the social or economic structure of the community is disrupted and the fulfillment of some or all of the community's essential functions are prevented.

Disaster resilience: Refers to the capability to prevent or protect against significant threats and incidents including attacks, and to expeditiously recover and reconstitute critical services with minimum damage to public safety and health, the economy, and national security.

Economic Consequence: The effect of an incident, event, or occurrence on the value of property or on the production, trade, distribution, or use of income, wealth, or commodities.

Emergency: An event, expected or unexpected, involving shortages of time and resources, that places life, property, or the environment in danger, and that requires response beyond routine incident management resources.

Emergency Action Plan: A plan of action to be taken to reduce the potential for property damage and loss of life in an area.

Evaluation: The process of examining, measuring and/or judging how well an entity, procedure, or action has met or is meeting stated objectives.

Flood: A temporary rise in water surface elevation resulting in inundation of areas not normally covered by water. Hypothetical floods may be expressed in terms of average probability of exceedance per year such as one-percent-chance-flood, or expressed as a fraction of the probable maximum flood or other reference flood.

Floodplain: An area adjoining a body of water or natural stream that may be covered by floodwater. Also, includes the downstream area that would be inundated or otherwise affected by the failure of a dam or by large flood flows. The area of the floodplain is generally delineated by a frequency (or size) of flood.

Function: Service, process, capability, or operation performed by an asset, system, network, or organization.

Hazard: Natural or man-made source or cause of harm or difficulty.

Implementation: An act of putting a procedure or course of action into effect to support goals or achieve objectives.

Incident: An occurrence, caused by either human action or natural phenomena, which may cause harm and may require action. Incidents can include major disasters, emergencies, terrorist attacks, terrorist threats, wild and urban fires, floods, hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, hurricanes, tornadoes, tropical storms, war-related disasters, public health and medical emergencies, and other occurrences requiring an emergency response.

Infrastructure: The framework of interdependent networks and systems comprising identifiable industries, institutions (including people and procedures), and distribution capabilities that provide a reliable flow of products and services essential to society as a whole.

Interdependency: Mutually reliant relationship between entities.

Inundation Map: A map showing areas that would be affected by flooding.

Key Resources: Publicly or privately controlled resources essential to the minimal operations of the economy and government.

Key Stakeholders: Include public and private-sector organizations that play major roles in providing essential services and products that underpin the economic vitality of a region, the welfare of its citizens, support national security, and that are necessary for disaster response and recovery.

Long-term Recovery: The process of recovery that follows a disaster event and may continue for months and years. Examples include the complete redevelopment and revitalization of the damaged area, which could mean returning the area to conditions set in a long-term recovery plan.

Mitigation: Ongoing and sustained action to reduce the probability of or lessen the impact of an adverse incident.

Model: An approximation, representation, or idealization of selected aspects of the structure, behavior, operation, or other characteristics of a real-world process, concept, or system.

Multi-Hazards: Include significant events such as infrastructure deterioration, natural disasters, accidents, and malevolent acts.

Natural Hazards: A source of harm or difficulty created by a meteorological, environmental, or geological phenomenon or combination of phenomena.

Network: A group of components that share information or interact with each other in order to perform a function.

Non-Profit Organizations: Voluntary, faith-based and community organizations, charities, foundations, philanthropic groups, as well as professional associations and academic institutions.

Owners/Operators: Those entities responsible for day-to-day operation and investment in a particular asset or system.

Preparedness: Activities necessary to build, sustain, and improve readiness capabilities to prevent, protect against, respond to, and recover from natural or manmade incidents. Preparedness is a continuous process involving efforts at all levels of government and between government and the private sector and nongovernmental organizations to identify threats, determine vulnerabilities, and identify resources to prevent, respond to, and recover from major incidents.

Prevention: Actions taken and measures put in place for the continual assessment and readiness of necessary actions to reduce the risk of threats and vulnerabilities, to intervene and stop an occurrence, or to mitigate effects.

Prioritization: The process of using risk assessment results to identify where risk-reduction or –mitigation efforts are most needed and subsequently determine which protective actions should be instituted in order to have the greatest effect.

Protection: Actions or measures taken to cover or shield from exposure, injury, or destruction. Protection can include a wide range of activities, such as hardening facilities, building resiliency and redundancy, incorporating hazard resistance into initial facility design, initiating active or passive countermeasures, installing security systems, promoting workforce surety, training and exercises, and implementing cyber security measures, among various others.

Recovery: The development, coordination, and execution of service and site restoration plans for affected communities and the reconstitution of government operations and services through

individual, private sector, nongovernmental, and public assistance programs that identify needs and define resources, provide housing and promote restoration, address long-term care and treatment of affected persons, implement additional measures for community restoration, incorporate mitigation measures and techniques as feasible, evaluate the incident to identify lessons learned, and develop initiatives to mitigate the effects of future incidents.

Redundancy: Additional or alternative systems, sub-systems, assets, or processes that maintain a degree of overall functionality in case of loss or failure of another system, sub-system, asset, or process.

Region: Any area that is defined as such by resident stakeholders responsible for disaster preparedness and management. A region can be a municipality, a single state (or province), or a portion of a state and may be multi-jurisdictional or cross national borders. Regions generally have certain accepted cultural characteristics and geographical boundaries and tend to coincide with the service areas of the infrastructures that serve them.

Resilience: The ability to resist, absorb, and recover from or successfully adapt to adversity or a change in conditions; capacity of an organization to recognize threats and hazards and make adjustments that will improve future protection efforts and risk reduction measures.

Response: Activities that address the short-term, direct effects of an incident, including immediate actions to save lives, protect property, and meet basic human needs. Response also includes the execution of emergency operations plans and incident mitigation activities designed to limit the loss of life, personal injury, property damage, and other unfavorable outcomes. As indicated by the situation, response activities include applying intelligence and other information to lessen the effects or consequences of an incident; increasing security operations; continuing investigations into the nature and source of the threat; ongoing surveillance and testing specific law enforcement operations aimed at preempting, interdicting, or disrupting illegal activity, and apprehending actual perpetrators and bringing them to justice.

Restoration: Returning a physical structure, essential government or commercial services, or a societal condition back to its pre-disaster or a new normal state through repairs, rebuilding, or reestablishment.

Risk: The potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences.

Risk Analysis: A systematic examination of the components and characteristics of risk.

Risk Assessment: The product or process which collects information and assigns values to risks for the purpose of determining priorities, developing or comparing courses of action, and informing decision making.

Risk Communication: The exchange of information with the goal of improving risk understanding, affecting risk perception, and/or equipping people or groups to act appropriately in response to an identified risk.

Risk Management: The process of identifying, analyzing, assessing, and then selecting and evaluating, and implementing strategies for maximizing resilience within limited resources.

Risk Profile: The description and/or depiction of risks to an asset, system, network, geographic area, or other entity.

Risk Reduction: The decrease in risk through risk avoidance, risk control, or risk transfer.

Scenario: A hypothetical situation comprised of a hazard, an entity impacted by that hazard, and associated conditions including consequences.

Sector: A term used to delineate a collection of assets, systems, or networks that provide a common function to the economy, government, or society.

Sensible Security: Is the level of protection achieved through design, construction, and operation that mitigates adverse impact to systems, facilities, and assets in proportion to their value to society and their likelihood of being affected by natural and/or man-made events.

Short-term Recovery: Phase of recovery in which the scope of damages and needs are assessed, basic infrastructure is restored, and recovery organizations and resources are mobilized.

Simulation: A model that behaves or operates like a given process, concept, or system when provided a set of controlled inputs.

Stabilization: The process by which the immediate impacts of an event on community systems are managed and contained.

Steady State: The posture for routine, normal, day-to-day operations as contrasted with temporary periods of heightened alert or real-time response to threats or incidents.

System: Any combination of facilities, equipment, personnel, procedures, and communications integrated for a specific purpose.

Threat: A natural or manmade occurrence, individual, entity, or action that has or indicates the potential to harm life, information, operations and/or property.

Threat Assessment: The process of identifying or evaluating entities, actions, or occurrences, whether natural or man-made, which has or indicates the potential to harm life, information, operations and/or property.

Vulnerability: A physical feature or operational attribute that renders an entity open to exploitation or susceptible to a given hazard.

Vulnerability Assessment: Process for identifying physical features or operational attributes that render an entity, asset, system, network, or geographic area susceptible or exposed to hazards.