USING THE CORE CAPABILITIES

TO BUILD RESILIENCY FOR COUNTIES

A Masters Thesis

of

American Public University

by

Allen B. King, III, CEM

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Arts

April 2017

American Public University

Charles Town, WV

The author hereby grants the American Public University System the right to display these contents for educational purposes.

The author assumes total responsibility for meeting the requirements set by the United States copyright law for the inclusion of any materials that are not the author's creation or in the public domain.

DEDICATION

I dedicate this thesis to my wife Angela, and my daughter Jaimee and son Benton. Without their patience, understanding, support, and, most of all, love, the completion of this work would not have been possible.

ABSTRACT OF THE THESIS

USING THE CORE CAPABILITIES

TO BUILD RESILIENCY FOR COUNTIES

by

Allen Benton King, III, CEM

American Public University System, April 23, 2017

Charles Town, West Virginia

Professor Robert L. Ditch, Thesis Professor

The lack of core capability guidance for United States (U.S.) counties diminishes their

preparedness and resilience and is a barrier to increasing both for the Nation. Though

there is a lot of literature available, the guidance for building resiliency for counties is

inconsistent. This paper applies the Mitigation core capabilities as a model for building

resilience through pre-disaster mitigation of the targets for the Recovery core capabilities.

This paper searched multiple-types of sources primarily published after 2011 that include

national doctrine and guidance documents, books, reports, journals, articles, and other

sources to triangulate findings and emphasize findings and facts. The research found that

counties should use incentives to promote resilience-building strategies and actions for

individuals, families, and businesses. A key component of community resilience is social

cohesion, or the value of belonging to the community. Counties need to integrate the use

of spontaneous volunteers and community associations as resilience-force-multipliers.

Improving the core capabilities that build resilience can ultimately result in a county

developing a resilience dividend. This paper offers recommendations for national

guidance and grants to promote increasing resilience-building from the bottom-up,

focusing at the county-level.

Keywords: resilience, resilient counties, resilience-building, incentives,

spontaneous volunteers, community associations, resilience-force-multipliers

TABLE OF CONTENTS

Introduction

The Federal Emergency Management Agency (FEMA) (2015c) released the National Preparedness Goal identifying 32 core capabilities described as "distinct critical elements" (p.1) preparing for our greatest risks and accomplishing the five mission areas to prevent, protect, mitigate, respond, and recover from a disaster. The Federal Government uses core capabilities to align federal resources to support the preparedness and resilience-building needs of state and local governments, such as counties. The stated intent of the core capabilities in the Goal is to increase the resiliency and the security of the Nation (Federal Emergency Management Agency, 2015c).

As defined by FEMA (2008) in the National Incident Management System, pre-disaster preparedness planning and resource management support the successful coordination of the Prevention, Response, and Recovery resources during the response to an incident. FEMA (2016e) state that both the Protection framework and the Mitigation framework describe steady-state actions for protecting infrastructure and systems, and actions to mitigate or to protect the impact from a disaster. The Mitigation framework makes the distinction that the Mitigation capabilities build resilience and support the Recovery capabilities. This paper applies the Mitigation core capability titles as a model for building resiliency of a county for the Recovery capabilities beyond the descriptions from the Goal.

FEMA (2015c) defines resiliency as the ability to adapt, withstand and recover from a disaster. Rodin (2014) adds pre-disaster preparedness increases the capacity for recovery so a county actually "bounces forward" (p. 224). This paper reveals not only can response and recovery preparedness be increased through building resilience, new

opportunities may become available that the county would not have if they would have

not reduced the risk and increased resilience. Through investing in resilience, counties

can become more attractive and marketable for economic investment and development

than counties that are more vulnerable (Rodin, 2014).

Focus on Counties

This paper informs national preparedness guidance and preparedness grants to

increase promoting the planning and coordination for resilience building from the

bottom-up, focusing at the county-level. The United States (U.S.) Census Bureau (2016)

identifies 3,143 counties or county equivalents. Included as county equivalents are

Louisiana parishes, independent cities in Virginia, Alaskan boroughs, and the District of

Columbia. The National Association of Counties (NACo) (2016) notes the first local

form of county government in the U.S. were the shires in the Virginia colony in the early

1600s. Shires later became counties. Across the U.S. there are several different forms of

county governments, but all provide most of the basic services throughout the U.S.

Counties contribute more than $290 billion annually for basic services to citizens of the

U.S. Counties deliver more than $45 billion annually for emergency response and law

enforcement. Counties administer more than $100 billion each year supporting more

than 1,000 hospitals, 1,500 public health departments, and to support Medicaid. Counties

maintain more than 40 percent of bridges and roads in the U.S. and provide more than

$120 billion annually for basic infrastructure and public works. FEMA writes almost all

of its guidance for planning and preparedness grants for states, but not specifically for

counties. Counties also need guidance for building resilience (National Association of

Counties (NACo), 2016).

Fugate (2015) requested a funding increase from Congress for the 2016 Pre-Disaster Mitigation Grant (PDM) with the stated intent to "minimize risk while increasing resiliency". FEMA (2016f) in the 2016 National Preparedness Report highlighted four Recovery and two Protection core capabilities identified as needing improvement. Research for this paper provides specific recommendations for how U.S. counties can use the core capabilities to build resilience as needing improvement. This paper examines using incentives such as the PDM for planning and building resiliency for counties.

Problem Statement

The lack of basic core capability guidance for counties diminishes their preparedness and resilience and is a barrier to increasing both for the Nation. The problem is most core capability focused resilience guidance from the Federal Government is written for states and not for counties. This paper examines how U.S. counties can use the core capabilities from the Goal for building disaster resilience.

<div align="center">

Literature Review

</div>

FEMA (2015c) in the Goal stated in a concise sentence "A secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk" (p. 1). The Goal defines five preparedness mission areas that includes "Prevention, Protection, Mitigation, Response, and Recovery" (p. 2). Through the 32 core capabilities in the Goal, the U.S. describes how we as a nation, intend to prepare for threats and hazard risks. When counties prepare to accomplish the capabilities to meet

the threats and risks they face, the security and resilience of the U.S. is improved (FEMA, 2015c).

Core Capabilities by Mission Area

Prevention	Protection	Mitigation	Response	Recovery
Planning				
Public Information and Warning				
Operational Coordination				
Intelligence and Information Sharing		Community Resilience	Infrastructure Systems	
Interdiction and Disruption		Long-term Vulnerability Reduction	Critical Transportation	Economic Recovery
Screening, Search, and Detection		Risk and Disaster Resilience Assessment	Environmental Response/Health and Safety	Health and Social Services
Forensics and Attribution	Access Control and Identity Verification	Threats and Hazards Identification	Fatality Management Services	Housing
	Cybersecurity		Fire Management and Suppression	Natural and Cultural Resources
	Physical Protective Measures		Logistics and Supply Chain Management	
	Risk Management for Protection Programs and Activities		Mass Care Services	
	Supply Chain Integrity and Security		Mass Search and Rescue Operations	
			On-scene Security, Protection, and Law Enforcement	
			Operational Communications	
			Public Health, Healthcare, and Emergency Medical Services	
			Situational Assessment	

Table 1. Core Capabilities by Mission Area (FEMA, 2015c, p. 3)

Core Capabilities

   The Goal. The core capabilities reflect the inherent differences between the five mission areas as represented in Table 1 (FEMA, 2015c). The first mission area has capabilities that are used for averting or stopping the intent or the execution of an act of

terrorism is Prevention. Many of the same capabilities are also used in actions to increase

the safety and security of critical assets and systems falls under the Protection mission

area. Implementing strategies and actions to lessen the impacts of threats and hazards are

accomplished by the Mitigation mission area core capabilities. Capabilities that are used

for immediate actions taken after a disaster to save lives and property are within the

Response mission area. Core capabilities used for restoring and rebuilding what was

damaged or destroyed are in the Recovery mission area. The mission areas are often

interconnected through shared resources and necessitate integration for accomplishing the

core capabilities (FEMA, 2015c).

     National Frameworks. FEMA (2016i) released the National Disaster Recovery

Framework (NDRF) describing the core capabilities that are needed to restore and

recover after a disaster. The NDRF states its primary value comes from emphasizing pre-

disaster preparedness, even though most of the NDRF is focused on long-term recovery.

The focus for pre-disaster preparedness in the NDRF is on planning. To inform recovery

planning, counties need to coordinate with all stakeholders to apply selected mitigation

strategies to reduce risks, confirm the recovery resources available, plan for continuity of

operations, and build the skills and capacity necessary for a quick recovery. The

Mitigation and Protection mission areas are focused on mitigating, protecting, and

building resilience for the same community systems the Recovery core capabilities

support.

     FEMA (2016d) describes in the Mitigation framework, the core capabilities

needed to reduce risks and improve resiliency for vulnerabilities to threats and hazards.

The Mitigation framework describes capabilities that focus actions to reduce risks and to

increase resilience for a county. For mitigation, the Planning core capability provides the process a county can use to analyze and then prioritize strategies to lessen the risks. Operational Coordination provides the structure for collaboration and limits duplication. The Public Information and Warning core capability gives a platform to message resilience-building risk awareness information to the county. Combining the Threats and Hazards Identification core capability and the Risk and Disaster Resilience Assessment core capability offers decision-makers threat and hazard information for the county and sub-state region mitigation strategies. Risk reduction actions taken to accomplish the mitigation strategies selected are applied in the Long-Term Vulnerability Reduction core capability. The Community Resilience core capability provides the process for all mitigation core capabilities to support increasing resilience.

FEMA (2016e) continues describing the core capabilities needed to deter threats, decrease vulnerabilities, and increase resiliency of the infrastructure sectors critical for the Nation. The Protection framework describes steady-state and enhanced steady-state protection activities. The Protection framework outlines guidance for increasing the security, preparedness, and resilience of the infrastructure sectors that are critical for the Nation. Both Protection and the Mitigation mission areas are focused on reducing risks for the infrastructure – Protection secures and deters threats and Mitigation reduces risks. Protection and Mitigation also focus to increase economic and community resilience and not simply satisfied with a quick restoration of services and reopening of a closed building during a Recovery. The Protection mission area links resources and capabilities that support the Response and Recovery mission areas shared core capability Infrastructure Systems that seeks to restore and recover infrastructure damaged in a

disaster. Most of the investments to improve resilience in protection strategies are made by the owners of public and private infrastructure.

FEMA (2016h) continues describing the capabilities used in the U.S. to respond after a disaster to save lives, provide for basic needs and to protect the homes, businesses, and the environment, and begin the restoration process. In the National Response Framework (NRF), FEMA describes 15 response core capabilities. The Infrastructure Systems core capability is a shared core capability with the Recovery mission area.

FEMA (2016g) in the National Prevention Framework describes the capabilities needed "to prevent an imminent terrorist attack" (p. 1). Described are seven capabilities. The Prevention mission area has a single separate core capability, three capabilities shared with Protection, and three cross-cutting capabilities. The Prevention core capabilities increase security (FEMA, 2016g).

Holdeman (2017) advocates changing the current five mission areas back to the four phases of emergency management. Holdeman views prevention and protection as components of mitigation, and not as separate mission areas. The current preparedness concept include prevent, protect, mitigate, respond, and recover mission areas. Holdeman proposes changing the preparedness phases back to prepare, mitigate, respond, and recover with resilience as the overarching emergency management concept.

National Preparedness Report. FEMA (2016f) released the annual National Preparedness Report analysis of preparedness data from local, state, and federal organizations to determine improvements and deficits for preparedness. FEMA reported that the Nation continued to have the four Recovery core capabilities assessed as needing improvement along with two Protection core capabilities also needing improvement.

Also, the International Code Council released higher resilient building codes

recommended by FEMA in 2015.

Resiliency Described

FEMA (2015c) in the Goal defines resilience as "the ability to adapt to changing

conditions and withstand and rapidly recover from disruption due to emergencies" (p. A-

2). The frameworks for each of the five mission areas modify the definition of resilience.

Other guidance also provides additional modifications for the definition (FEMA, 2015c).

FEMA (2016i) through the NDRF defines resilience as the capability to prepare,

adapt to changes, and to tolerate and recover quickly from a disaster. Resilience is

further stated as a product of the pre-disaster recovery planning process, developing

recovery leaders, and building partnerships. The NDRF also describes resiliency as both

a social and a physical outcome.

FEMA (2016d) states that risk management, mitigation, planning, and resourcing

preparedness are key components of building resilience. The word is intentionally used

with two separate meanings. First, there is an informed process to build resilience and

second, the outcome of the process is resilience. The Mitigation framework provides the

model for building resilience through hazard identification, risk assessment, and

vulnerability reduction. This framework could arguably be renamed the National

Resilience Framework by separating guidance for resiliency, and the hazard mitigation

program and flood insurance into separate sections.

FEMA (2016e) states that resilience may be improved by increasing security,

hardening buildings and structures, redundant protections, and improving resistance to

hazards through design, technology, and training. Protection promotes public and private

partnerships for the implementation of protection actions and building resiliency. The

Protection framework supports resiliency-building (FEMA, 2016e).

FEMA (2016h) through the NRF promotes mitigating risks to reduce the response

resource requirements for the core capabilities. The NRF also advocates counties build a

recovery plan before the disaster. The focus of the NRF is for jurisdictions and

organizations that delivers or supports increasing the preparedness of the response

capabilities.

FEMA (2016g) through the Prevention framework states that integrating law

enforcement into all planning improves community resilience. The Prevention

framework informs the public and private sectors and provides guidance to law

enforcement for the prevention of terrorism. For a county, the Prevention core

capabilities primarily support security but integrating law enforcement into all planning

improves community resilience.

To improve the resilience of a community, the U.S. Department of Health and

Human Services (2015) emphasizes using the healthcare system for improving individual

and community health. Counties ought to add individual and public health as key

components to the definition of community resilience. Resilient communities have

developed resources to mitigate health risks and developed resources to protect the

community health during a disaster.

Chandra, et al., (2011) also provides a definition of resilience focused on

individual and public health for a community. Resilience seeks to prevent or mitigate

stressors on individual and community health caused by a disaster. Disaster response and

recovery can actually inform resilience building strategies. Individual and family healthy lifestyles are key to the overall health resilience of a county.

A resilient county is described as having common characteristics. These include county leadership committed to building resilience, continued steady enhancements in preparedness, a shared vision, and recognition of the interdependencies of infrastructure systems (National Institute of Standards and Technology (NIST), 2015a). Resilient counties also understand the needs and desires of the citizens of the county are actually why the infrastructure were built. The county prioritize infrastructure for resilience strategies based on both social and economic importance (NIST, 2015b).

In a presentation to the National Electric Safety Code Summit, Cauffman (2015) briefed the needs of the community drives the development of the infrastructure and buildings in a county. Disaster planning often does not consider how buildings and the infrastructure are interdependent or consider their importance to the social institutions of a county. Building resilience in a county is more than simply mitigating risk and includes implementing actions supporting recovery.

Istrate, Kavita, and Nowakowski (2014) advocate the economy is a major component for the resiliency of a county. Counties provide the basic governmental services, law enforcement and security, and many infrastructure systems that are necessary for a resilient economy. Counties should add to their description of resiliency, the ability to prosper during changes from natural or economic disasters.

Dezouza, Flanery, Alex, and Park (2012) states the term resilience is often used too casually with a seemingly indifference to changing meanings. Their article proposed resilience is case or situational specific. Another observation they made is resilience can

be used as both a verb and an adjective. As a verb, it is the tactics or actions used to

build or improve resilience. As an adjective, resilience is the outcome or the result.

Characteristics of Resilience. Rodin (2014) proposes five characteristics for the

definition of resiliency; "awareness, diversity, integration, self-regulation, and

adaptation" (p. 7). A county needs to be aware of the threats, hazards, and the

vulnerabilities it has. It then needs to consider the strengths and the resources it has to

effectively prepare and to build resilience. Awareness includes constant assessment and

reevaluating approaching real-time situational awareness. Social media such as texting,

emails, and Twitter is a means for receiving situational awareness. A county needs more

than one source of capabilities that provides flexibility and adaptability through the

redundant capacity, or diversity. Having redundant capability such as acquiring back-up

generators is an example of diversity. A county needs to have integration, the ability to

collaborate, develop, and coordinate multiple systems functions and actions. A county

needs to self-regulate its actions to avoid cascading incidents and process failure. A

county needs flexibility to use its capacity to adapt plans and actions (Rodin, 2014).

Social Cohesion. Rodin (2014) advocates developing and enhancing a sense of

commitment, shared values and a common identity she describes as social cohesion.

Strengthening infrastructure and systems is fundamental for building resiliency, but a

critical component for a resilient county is to build social cohesion. FEMA (2016c) also

identifies the connectedness of social networks within a county as a key attribute of

resilience.

The NIST (2015b) uses Maslow's Hierarchy of Needs (Maslow, 1943) to display

building resiliency on top of the foundation of fulfilling the basic needs and expectations

of county residents. Counties primarily build the capacity of Response core capabilities

to protect life and property and provide the immediate post-disaster sustenance, clothing

and shelter and for providing stability and for restoring the access to healthcare, and

return to their place of work. Capabilities that can add social cohesion to the basic

survival, safety and security requirements can build resilience. Some core capabilities

improve social cohesion, or the sense of belonging, and adds to individuals and

communities having a sense of fulfillment can begin to have a resilience dividend (NIST,
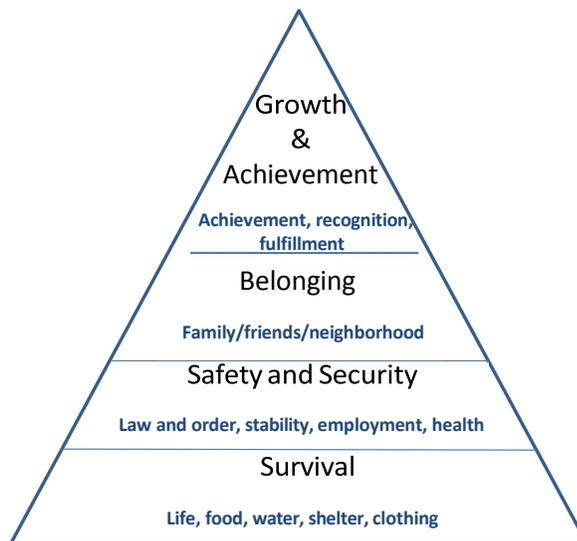
2015b).

Figure 1: Maslow's Hierarchy of Human Needs (Adapted from Maslow 1943) (NIST,

2015b, p. 13)

Resilience Dividend. Rodin (2014) defines resilience as the capacity to recover

from disruptions through prior preparedness actions that increase the capacity to not only

bounce back, but to actually improve and strengthen recovery. Rodin provides context to

help planners to build disaster resilience. Her position is based on the definitions of

resilience from the fields of engineering, psychology, and ecology. Also described are

three resilience-building phases including readiness, responsive, and the capacity to

revitalize. She promotes both soft and hard forms of resilience as needed for structural,

natural, and social applications. Using numerous vignettes she describes the concept of a

resilience dividend (Rodin, 2014).

Planning for Resiliency

FEMA (2017) released the Pre-Disaster Planning Guide for Local Governments to

provide guidance to help cities and counties develop their recovery plans. The guidance

includes adapting nine recovery planning activities to align with the Comprehensive

Preparedness Guide (CPG)-101 six-step format used by emergency managers.

Developing a pre-disaster recovery plan aligned with the CPG-101 structured Emergency

Operations Plan can help to identify gaps and opportunities to build resilience.

FEMA (2015a) provides guidance in the Effective Coordination of Recovery

Resources for State, Tribal, Territorial and Local Incidents counties also need to consider.

Although this guidance focuses on planning a recovery after a disaster, counties actually

need to select one of the coordinating structures described pre-disaster to help guide the

planning for building resiliency. Three coordinating structures were recommended – a

Task Force, a Recovery Committee, and Recovery Support Functions.

FEMA (2013b) recommended counties also consider integrating the guidance

within the Local Mitigation Planning Handbook into their planning for building

resiliency. This handbook provides the official guidance for how counties need to

comply with the legal requirements of Title 44 Code of Federal Regulations §201.6 and

for obtaining approval for the mitigation plan from FEMA. The handbook also provides

examples and recommended best practices for planning to reduce risks over the long-term and mitigation strategies for building a resilient county.

The NIST (2015a) released the two-volume Community Resilience Planning Guide for Buildings and Infrastructure Systems (Guide) provides guidance for counties to develop a strategic resiliency plan. Volume 1 describes a six-step process and incudes a planning example. Volume 2 is a companion reference with descriptions and technical information for improving the resiliency of buildings; and transportation, energy, communications, and water and wastewater systems. The Guide helps counties to invest in projects that are both economical and meet resilience goals. The Guide can help the county increase resilience, integrate risk management and response planning, and the improve development planning for the county. The Guide is aligned with the short, intermediate, and long-term recovery phases used in the NDRF. The Guide describes both construction actions and describes administrative options for building resiliency. Considering the social goals of a county and how dependent it is on the buildings and infrastructure systems; the Guide helps a county to prioritize actions, identify and consider actions to build resilience and deciding to not take an action, and integrating other planning with the strategic resilience plan.

Gilbert, Butry, Helgeson, and Chapman (2015) provide a methodology for counties to develop strategic plans for building resiliency for buildings and infrastructure systems. The NIST Economic Guide provides a standard method for evaluating the resiliency investments of buildings for present and future cost-benefit considering both cost savings and cost avoidance. A county should consider the social benefit and importance of a building or infrastructure when evaluating an investment. The

methodology provided in this report promotes the value of targeting investments that

increase the resiliency aligned with the social goals and objectives of the county.

Example of County Planning for Resilience. Rahman (2014) provides a report

on the effort to develop plans for resilient post-disaster recovery for King County,

Washington over a two-year planning process. King County developed a comprehensive

strategy for the revival of the county that will inform the development of a sub-state

regional recovery plan. King County intends to use recovery planning to improve

resilience for future disasters and to quickly restore the economy and social quality of

life. This paper proposes the process can also improve pre-disaster resiliency.

LIFELINE INFRASTRUCTURE	BUILDING STOCK	COMMERCE	HEALTH & SOCIAL SERVICES	NATUTRAL & CULTURAL RESOURCES
•Utilities	•Housing	•Finance & banking	•Medical care	•Historic places
•Communication & information technology	•Commercial & industrial facilities	•Retail, wholesale & services	•Mental health	•Sense of place
•Transportation	•Public buildings	•Real estate & construction	•Education	•Food & farming
•Dams & levees	•Planning and community development	•Manufacturing	•Government programs	•Ecosystem services
			•Security & law enforcement	•Climate change
				•Environmental planning

Table 2: Resilient King County Critical Sectors and Subsectors (Rahman, 2014, pg. 9)

According to Rahman (2014) the Resilient King County planning team adapted

the Recovery Support Functions to develop their five critical sectors for the county.

Lifeline Infrastructure and part of Building Stock correlates with the Infrastructure

Systems Recovery core capability. The remaining Housing subsector from the Building

Stock sector correlates with the Housing Recovery core capability. Commerce correlates

with Economic Recovery capability and Health and Social Services and Natural and

Cultural Resources are basically the same as the Recovery core capability (Rahman,

2014).

Health Resiliency. Chandra, et al. (2011) gives a report of their analysis of community resilience in the U.S. The intent of the research was to provide guidance for the development of local strategies for developing community health resilience. Options for developing strategies were provided that counties can incorporate into their resilience planning.

Eisenman, et al., (2014) describe the design of the tools developed by Los Angeles County to build community health resilience. Using Public Health Emergency Preparedness grant funding from the Centers for Disease Control, Los Angeles County developed a public health resilience improvement project that utilizes community health nurses trained on county strategies to promote and provide training on public health resilience. A targeted outcome is for the nurses to build Community Resilience Coalitions. Los Angeles County developed a Community Resilience Toolkit that:

- Includes training on preparedness and tools for public health resilience.
- Provides guidance for developing resilience champions.
- Provides stress-reducing psychological training.

Private Sector Resilience. The U.S. Resilience Project (2011) brought government and business leaders together to discuss how the private sector could promote new and emerging policy and actions for building resilience by:

- Providing examples of best practices for building preparedness and resiliency.
- Building on industry key competencies.
- Promoting the private sector resilience building strategies and processes.

Resilience Indicators. FEMA (2016c) provides the Mitigation Framework Leaders Group research summary of potential indicators for measuring resilience.

Several of the proposed indicators counties can use. The proposed indicators listed in Table 3 can help counties develop strategies for building resilience aligning the Mitigation and Recovery core capabilities.

Core Capability	Indicators
Core Capability: Housing	• Indicator 1: Housing Condition • Indicator 2: Housing Affordability
Core Capability: Health	• Indicator 3: Health Care Availability • Indicator 4: Healthy Behaviors • Indicator 5: Environmental Health
Core Capability: Economic Recovery	• Indicator 6: Employment Opportunity • Indicator 7: Income
Core Capability: Infrastructure Systems	• Indicator 8: Roadway Conditions • Indicator 9: Transportation Connectivity • Indicator 10: Transit Accessibility • Indicator 11: Water Sector Emergency Support • Indicator 12: Dam Safety • Indicator 13: Integrated Infrastructure Sector Preparedness
Core Capability: Natural and Cultural Resources	• Indicator 14: Water Conservation • Indicator 15: Wetlands Conservation • Indicator 16: Forest Conservation • Indicator 17: Habitat Quality
Core Capability: Threats and Hazards Identification	• Indicator 18: Risk Identification
Core Capability: Risk and Disaster Resilience Assessment	• Indicator 19: Risk Data • Indicator 20: Risk Awareness • Indicator 21: Community Preparedness
Core Capability: Planning	• Indicator 22: Mitigation Planning • Indicator 23: Planning Integration
Core Capability: Community Resilience	• Indicator 24: Collaborative Networks • Indicator 25: Civic Capacity
Core Capability: Long-Term Vulnerability Reduction	• Indicator 26: Building Codes • Indicator 27: Higher Standards • Indicator 28: Mitigation Investment

Table 3: FEMA Resilience Indicators (FEMA, 2016c, p. B-4)

Example of Developing Resilience Indicators. In a presentation to the Resilient America Roundtable, Cutter (2014) presented an overview of how a county could

develop measures for building resilience. She provided a comparison of several top-down and bottom-up resilience measurement tools a county could use or adapt for their specific needs. Cutter states having a measurement tool does not improve resiliency but can inform the development of strategies that do increase resiliency. Cutter also proposes the process for building resilience actually helps a county to improve the capacity to cope and develop self-sufficiency, which are key to building resiliency.

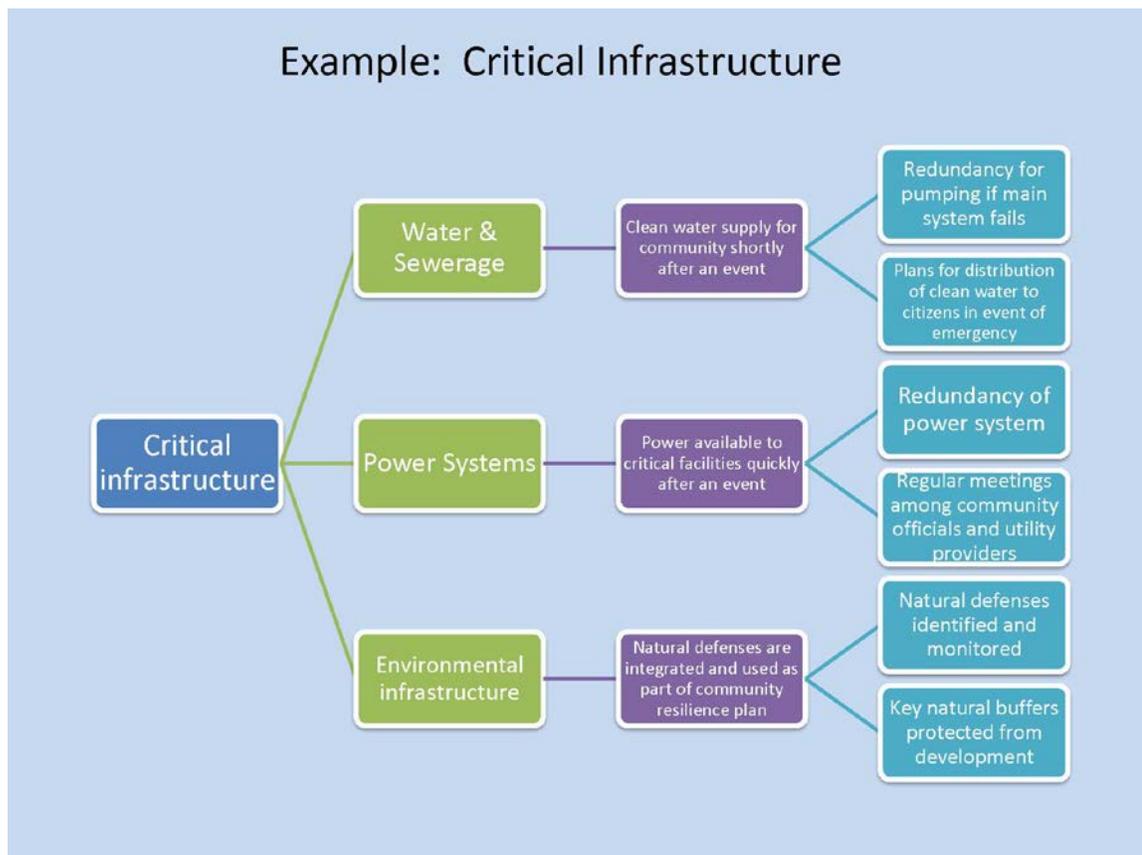Figure 2: Example How to Develop Resilience Measures (Cutter, 2014, slide 14)

As displayed in Figure 2, three infrastructure systems are used to illustrate how a county could develop its own resiliency measures. As an example, the objective for water and sewer systems may be to have clean water soon after a disaster. A county may decide redundancy for the pumping stations as the measure. In theory, by building

redundancy for more pumping stations the county increases resiliency for the water and sewer system critical infrastructure (Cutter, 2014).

American Project Report. Petkova, et al., (2016) reported on the findings from the eighth survey of the perceptions and opinions about preparedness for the U.S. Disaster preparedness planners can use the survey results as recommendations for developing communication messaging for individuals and families that make up the whole community within their county. Disaster planners need to integrate the whole community into the disaster planning, preparedness and resilience building strategies and actions.

Funding Resiliency. Stone (2015) wrote that many counties may expect the Federal Government through FEMA will provide the funding necessary for a full recovery. He bluntly denounces expecting someone else to fund a recovery as not planning for recovery. A county needs to develop a realistic and adaptable funding plan to address its recovery and resilience priorities.

Incentives

Kunreuther, Michel-Kerjan, and Pauly (2013) advocate in addition to enforcing cost-appropriate building codes for mitigating risk counties use incentives to promote resiliency. They noted that even after the devastation caused by the 2004 and 2005 hurricane seasons, 83 percent of the residents along the Gulf and Atlantic shorelines had still not taken actions to improve the capability of their homes to withstand a hurricane. Counties ought to consider modifying the taxation system for homeowners to receive tax credits as incentives for resilience improving mitigation actions they complete. Counties can also consider offering an award for exceeding the local building code standard, which

could increase the value of the home if the award is properly marketed. Another

incentive could be a negotiated insurance premium reduction for resilience improving

investments.

According to Kousky and Shabman (2016), privately acquired casualty insurance

provides the main source for financial resilience to disasters for most individuals,

families, and businesses. The insurance industry values resilience as potential cost

avoidance. Investments in building resilience have the potential to reduce potential

payouts and also to reduce the time for a recovery.

The Insurance Information Institute (2016) advocates that property owners may

be able to reduce the costs of insurance by investing in resilience. Insurers may reduce

premiums for the installation of storm-shutters or strengthening a roof. Retrofitting new

plumbing may receive a premium reduction as may retrofitting the electrical panels and

wiring of a building.

The National Institutes of Building Sciences (NIBS) (2015) also recommended

counties provide incentives for public and private investments for building community

resilience. Incentivizing most mitigation actions not only decreases the physical risk

from a threat or hazard but also includes reducing the financial cost required to recover.

Counties can also search for sources to finance resiliency incentives from state and

federal grants, insurance premium reductions, lower interest loans, reduced bond ratings,

and from private foundations.

FEMA (2016a) recommends counties that participate in the Community Rating

System (CRS) work to exceed the minimum requirements for floodplain management to

qualify for lower premiums for the county. Once the county gains recognition through

CRS, the county residents and business owners pay less for flood insurance. The

mitigation actions help to make the county more flood resilient.

The Federal Insurance and Mitigation Administration (FIMA) (2015) encouraged

counties to increase resilience through the $700 million Hazard Mitigation Assistance

(HMA) grants. The HMA grants promote counties to increase their resilience and stop

repeated losses through mitigating risks for critical infrastructure and climate adaptation.

Through the grant, FIMA also promoted cities and counties use the American Society of

Civil Engineers / Structural Engineering Institute 24-14 standards and building codes,

maintain floodplains, and invest in resilient infrastructure.

FEMA (2015b) emphasizes funding for capabilities through the Emergency

Management Performance Grant (EMPG) to improve security and increase resiliency for

U.S counties. In 2015 applicants were allowed to use EMPG grant funding for pre-

disaster planning for improving preparedness and recovery planning. Applicants were

also allowed to fund the purchase of emergency generators, cybersecurity equipment, and

equipment for interoperable communications as well as building or updating a county

emergency operation center.

In 2016, FEMA (2016b) focused the Homeland Security Grant Program (HSGP)

on improving the core capabilities identified as the lowest developed in the 2015 National

Preparedness Report. The three grant programs that make up HSGP can fund planning,

equipping, organizing, and training for the core capabilities. The HSGP supports all-

hazards preparedness, but can be used to build resilience.

Fugate (2015) in testimony to the U.S. Senate appropriations committee stated the

requested 2016 budget for FEMA emphasizes funding grants that will decrease risk and

increase resiliency. The additional $200 million requested would allow FEMA to offer

more than 600 PDM grants for building resiliency. A portion of the additional funding

requested was to hire additional staff in FEMA to manage grants.

In 2016, FIMA (2016) PDM grants provided $90 million for the planning and pre-

disaster mitigation projects that build resilience. A county is required to submit their

requests as a sub-applicant through the state. Projects to increase resilience for climate

adaptation were the first priority considered by FIMA for the 2016 PDM grants.

Summary of Findings

There is a great deal of literature available describing resilience and the core

capabilities, but there is inconsistent guidance provided specifically for how a county can

use the core capabilities to improve its resilience. Currently counties have to become

familiar with dozens of guidance documents as well as several standards. There are

numerous mission area or discipline specific definitions of resilience.

Many core capabilities represent the foundation for fulfilling basic human needs

and expected services before, during, and after a disaster. The strategies and actions to

build resilience are built on top of this foundation for basic human needs. A critical

component of resilience for a county is social cohesion. Adding social cohesion to

resilience can help a county to realize a resilience dividend, a benefit similar to goodwill

in business finance.

Methodology

Research Theory

This paper uses a comprehensive single-case design and a single narrative to

describe and analyze the qualitative research examining how U.S. counties can use the

core capabilities from the Goal for building disaster resilience. The research is based on a well-bounded theory the Mitigation core capabilities are a model for building resilience in a county through pre-disaster planning, preparedness, and the mitigation of the Recovery core capabilities. This paper utilizes a standard linear-analytic structure beginning with a problem statement, a literature review, the methodology and research questions, a discussion and analysis of the research, and offers a conclusion and recommendations (Yin, 2009).

Research Data Collection and Analysis Plan

The strategy used to write this paper includes applying the same theoretical propositions used to form the data collection plan and to conduct the case study analysis. This paper considers contrasting perspectives (Yin, 2009) for natural, structural, and social forms of resilience (Rodin, 2014) among the Recovery and Mitigation core capabilities. The methodology for this paper explains (Yin, 2009) how the Mitigation core capabilities; Threats and Hazards Identification, Risk and Disaster Resilience Assessment, Long-Term Vulnerability Reduction, and Community Resilience are a model for a county to build resilience (FEMA, 2015c).

The research includes national doctrine and guidance documents, a book on building resilience, multiple federal grant announcements, formal academic and scientific research papers, federal agency funded research reports, papers published in emergency management journals, emergency management conference and workshop reports and briefing slides, emergency management magazine articles, guidance from federal agency websites, and guidance from private sector websites. Some of the sources corroborated and augmented research from other sources. By searching multiple-types of sources for

"converging lines of inquiry" (p. 115), this paper triangulates findings to emphasize

findings and facts (Yin, 2009).

The hypothesis for this research is a county can use the Mitigation core

capabilities from the Goal as a model for building resilience through pre-disaster

planning and resourcing the Recovery core capabilities. Completing a Threats and

Hazards Identification plus a Risk and Disaster Resilience Assessment can provide

actions that need to be completed for attaining Long-Term Vulnerability Reduction

which upon completion may result in Community Resilience. This resiliency-building

model should be applied to pre-disaster planning for resourcing the Recovery core

capabilities; Infrastructure Systems, Economic Recovery, Health and Social Services,

Housing, and the Natural and Cultural Resources. A county can develop the core

capabilities to mitigate and prepare for the specific risks it faces and build resilience by

planning and resourcing what it needs to recover from a disaster (FEMA, 2015c).

Additional lines of inquiry this paper researched are:

- What is the difference between the building capacity of a core capability and

  building resiliency through a core capability?

- What core capabilities build a resilience dividend for a county?

- What incentive options are available to support the resilience-building strategies

  of a county?

Results

Analysis of Core Capabilities and Resilience

The 32 core capabilities are inherently different. The following Table 4

represents the results of analysis used to assess if a core capability support security,

preparedness, or resiliency (adapted from FEMA, 2015c).

Secure / Resilient	Planning (all)
Secure / Resilient	Public Information and Warning (all)
Secure / Resilient	Operational Coordination (all)
Secure	Forensics and Attribution
Secure	Intelligence and Information Sharing
Secure	Interdiction and Disruption
Secure	Screening, Search, and Detection
Secure	Access Control and Identity Verification
Secure	Risk Management for Protection Programs and Activities
Secure / Resilient	Cybersecurity
Secure	Physical Protective Measures
Secure / Resilient	Supply Chain Integrity and Security
Resilient	Threats and Hazards Identification
Resilient	Risk and Disaster Resilience Assessment
Resilient	Long-term Vulnerability Reduction
Resilient / Prepared	Community Resilience
Prepared	Critical Transportation
Prepared	Environmental Response/Health and Safety
Prepared	Fatality Management Services
Prepared	Fire Management and Suppression
Prepared	Logistics and Supply Chain Management
Prepared	Mass Care Services
Prepared	Mass Search and Rescue Operations
Prepared	On-scene Security, Protection, and Law Enforcement
Prepared	Operational Communications
Prepared	Public Health, Healthcare, and Emergency Medical Services
Prepared	Situational Assessment
Prepared / Resilient	Infrastructure Systems
Resilient	Economic Recovery
Resilient	Health and Social Services
Resilient	Housing
Resilient	Natural and Cultural Resources

Table 4: Analysis of the Core Capabilities Secure/Resilient/Prepared, adapted from

(FEMA, 2015c, pg. 3)

Further research is warranted to determine why only two possibilities consistently were selected in the analysis.

The analysis supports the hypothesis the Mitigation and Recovery core capabilities increase the resiliency of a county. The literature also supports the assumption that the Planning, Public Information and Warning, and Operational Coordination cross-cutting capabilities support securing, preparing, as well as building resiliency for a county. Two Protection capabilities, Supply Chain Integrity and Security and Cybersecurity, are noted in the literature as building resiliency as well as security for a county. The literature supports the assumption the Prevention capabilities increase the security of a county. The literature supports the assumption the Response capabilities increase the preparedness of a county. One Recovery core capability, Infrastructure Systems is also a Response core capability, so it is considered to build preparedness and resiliency. Another finding from the literature reviewed is one Mitigation core capability, Community Resilience can improve the resilience of a county by increasing the preparedness of individuals, families, and community associations and may have the greatest impact for building what Rodin (2014) describes as a resilience dividend.

Bias

The literature used for this research reflects multiple perspectives of what is resilience. Some mission area core capabilities focus on security, others focus on preparedness, some focus on resiliency, and many have elements of two or all three. To limit bias, this research chose to use the three forms of resilience from Rodin (2014); social, natural, and structural as a basis for selecting resilience building core capabilities. Capabilities determined to contribute to building social cohesion were weighted higher.

Analysis of Core Capabilities that Build Resilience

Rodin (2014) describes structural resilience as involving infrastructure sectors and buildings with resilience improved through ordnances, zoning, building codes, and sometimes granting waivers. Social resilience is described as including the human component social cohesion based on preparedness that can become a resilience force multiplier through community associations. Natural resilience involves the environment, can include the ecology and agriculture, and can be improved through enforcements of ordnances, land-use zoning, and sometimes through granting waivers.

Structural / Social / Natural	Planning
Social	Public Information and Warning
Social	Operational Coordination
Structural / Social	Cybersecurity
Structural / Social	Supply Chain Integrity and Security
Structural / Social / Natural	Threats and Hazards Identification
Structural / Social / Natural	Risk and Disaster Resilience Assessment
Structural / Social / Natural	Long-Term Vulnerability Reduction
Social / Structural / Natural	Community Resilience
Structural / Social	Infrastructure Systems
Structural / Social / Natural	Economic Recovery
Structural / Social	Health and Social Services
Structural / Social	Housing
Natural /Social	Natural and Cultural Resources

Table 5: Analysis of Core Capabilities with Rodin's Forms of Resilience, adapted from (FEMA, 2015c, pg. 3)

Comparing and contrasting the three forms of resilience, natural, structural, and social from Rodin (2014) with the resilience-building core capabilities from FEMA (2015c) provided the following results. The Planning core capability can contribute to improve the structural, social, and natural forms of resilience through planning using whole community experts from all three fields. The Mitigation core capabilities, Threats and Hazards Identification, the Risk and Disaster Resilience Assessment, Long-Term

Vulnerability Reduction, and Community Resilience also can contribute to improving all three forms of resilience. The Economic Recovery core capability also can improve all three forms of resilience. The Infrastructure Systems, Health and Social Services, Housing, Supply Chain Integrity and Security, and Cybersecurity core capabilities support improving the resilience of the structural and social forms of resilience. The Natural and Cultural Resources core capability support improving the resilience of the natural and social forms of resilience. Both the Public Information and Warning core capability and the Operational Coordination core capability support improving the social form of resilience (FEMA, 2015c).

Significance of Research

This research provides insight to U.S. county emergency managers and disaster planners how to use the core capabilities to build resilience for their counties. In addition, the research describes the benefit for counties to attain a resilience dividend. This research informs Federal Government agencies on county-level resilience-building guidance needed by U.S. counties**.**

<div align="center">

Discussion

</div>

Cross-Cutting Core Capabilities

All five mission areas contribute to and use the three cross-cutting core capabilities (FEMA, 2015c). Improving these capabilities for the Recovery and Mitigation mission areas can build resiliency (FEMA, 2017). All three core capabilities can improve resiliency for both the process and as an outcome (Dezouza, Flanery, Alex, & Park, 2012).

Planning. (FEMA, 2015a) a county guidance to inform pre-disaster planning and

for building a recovery coordination structure through the Effective Coordination of

Recovery Resources for State, Tribal, Territorial and Local Incidents. A county needs to

work toward developing recovery goals and priorities that builds resilience and speeds

recovery. FEMA (2017) aligned the recovery planning activities for a county with the

six-step planning process from CPG-101 which is the foundation for planning by

emergency managers. Table 6 aligns the CPG-101 six planning steps, the nine Recovery

Planning Key Activities, and the nine Mitigation Planning Tasks.

Relation to CPG 101	Recovery Planning	Hazard Mitigation Planning
Emergency Preparedness Planning Process STEPS	**Recovery Pre-Disaster Planning Guidance KEY ACTIVITIES**	**Local Mitigation Planning Handbook TASKS**
STEP 1. FORM A COLLABORATIVE PLANNING TEAM	1. Define the Core Recovery Planning Team and Scope of Planning Activities 2. Develop and Implement a Stakeholder and Partner Engagement Strategy	1. Determine Planning Area and Resources 2. Build the Planning Team 3. Create an Outreach Strategy
STEP 2. UNDERSTAND THE SITUATION	3. Determine the Community's Risks, Impacts, and Consequences 4. Assess Community's Capacity and Identify Capability Targets	4. Review Community Capabilities 5. Conduct a Risk Assessment
STEP 3. DETERMINE GOALS AND OBJECTIVES	5. Determine Leadership Positions and Define Operations 6. Establish Processes for Post-Disaster Decision-Making and Policy Setting	5. Conduct a Risk Assessment 6. Develop a Mitigation Strategy
STEP 4. DEVELOP THE PLAN	7. Write the Local Pre-Disaster Recovery Plan	6. Develop a Mitigation Strategy
STEP 5. PREPARE, REVIEW, AND APPROVE THE PLAN	8. Approve the Pre-Disaster Recovery Plan and Associated Regulations	8. Review and Adopt the Plan
STEP 6. IMPLEMENT AND MAINTAIN THE PLAN	9. Identify Ongoing Preparedness Activities	7. Keep the Plan Current 9. Create a Safe and Resilient Community

Table 6: Alignment of Recovery and Mitigation Planning with CPG-101 (FEMA, 2017,

pg. 73)

FEMA (2016i) describes the Recovery core capabilities supporting the long-term recovery needs for a county. By planning recovery actions pre-disaster a county can build and improve the capacity for recovery and determine actions to take pre-disaster to increase resiliency. A resilient county plans for its probable risks and determines the appropriate mitigation actions which can include use of building codes that increase resiliency of structures or land-use zoning that reduce risk by avoiding high risk areas. Through integrating mitigation and pre-disaster planning for recovery a county can reduce vulnerabilities and increase resilience. The pre-disaster recovery plan developed identifies the investment needed for increasing and sustaining the resilience of infrastructure and the actions to reach recovery goals.

FEMA (2016d) advocates integrating risk management into the Planning core capability for the Mitigation mission area. Resilience can be increased through county government and private sector planning integration and building the coalitions. Resilient counties utilize the expertise of the whole community to build sub-state regional coalitions.

The NIST (2015a) also aligned the recommended planning guidance for developing a county resilience plan with the CPG-101 six planning steps. Counties are recommended to identify the community leaders that can influence building resiliency in the county. Counties need to understand how their infrastructure and buildings supports the collective needs and expected social functions and the dependencies citizens have on social institutions. The plan should also identify both administrative and construction options for building resilience.

Rodin (2014) promotes planning as a key component of building resilience. She advocates that planners need to consider diverse alternatives and disparate ideas. Through the planning process a county can build the capacity for appropriate response and recovery.

The NIST (2015a) recommend owners of infrastructure systems, businesses and other private industry participate in resiliency planning with the county government. FEMA (2013b) recommends inclusion of county departments to enforce ordnances and regulate development also participate in the planning. Pre-disaster planning builds relationships that increase resilience and facilitate a better response and quicker recovery.
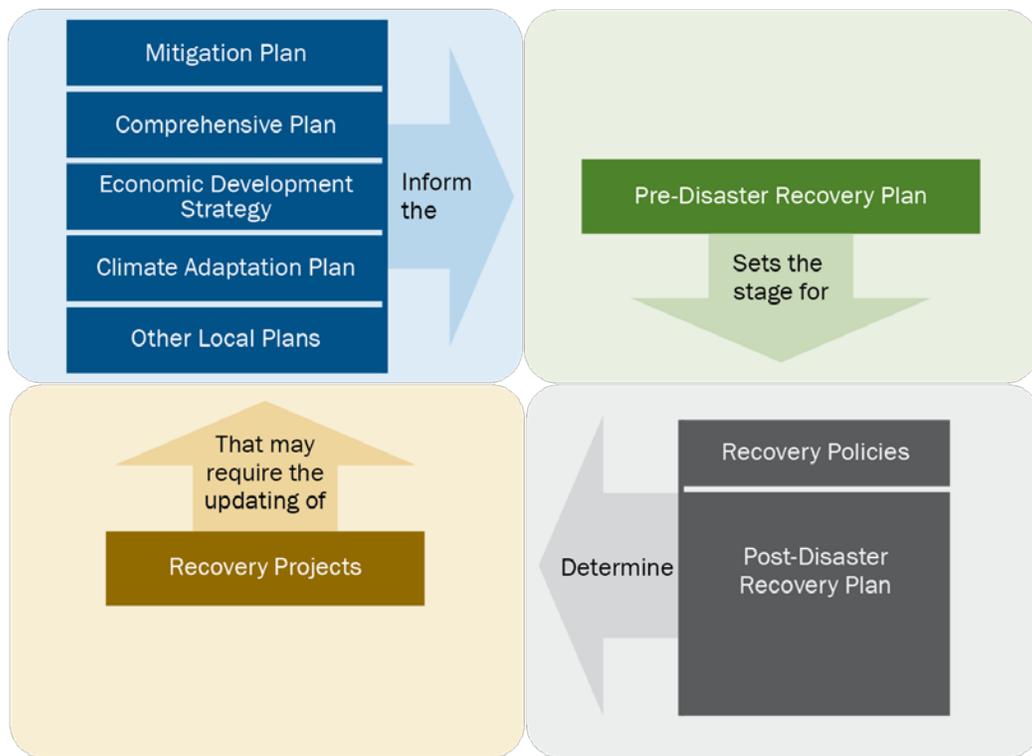
The Cyclical Nature of Planning

Figure 3: The Cyclical Nature of Planning – Recovery (FEMA, 2017, pg. 14)

Counties need to integrate mitigation strategies with the pre-disaster recovery planning to build resilience (FEMA, 2013b). In 2014, the American Planning

Association strongly recommended integrating resilience building into a county

Comprehensive Plan (NIST, 2015a). As described in Figure 3, the county resilience plan

needs to be integrated and coordinated with all county plans (FEMA, 2017).

Dezouza, Flanery, Alex, and Park (2012) observed most planning guidance

promotes the concept that a large multidiscipline team produces the more resilient plan.

Their research indicates this assumption may not be true for all types of planning. They

advocate plans developed by multidiscipline teams usually need a long period of time to

develop and are more appropriate for strategic plans.

FEMA (2013b) recommends counties prepare recovery ordnances pre-disaster to

avoid unnecessary delays in initiating a recovery after the disaster occurs. The recovery

ordnance should define the authorities for disaster regulations and authorize the county

recovery organizational structure. The ordnance can also authorize the county to develop

a recovery strategy for building resiliency.

Operational Coordination. FEMA (2016d) describes the Operational

Coordination core capability as how counties use the Mitigation core capabilities to

increase resiliency by integrating the private sector and building community coalitions.

FEMA (2016i) describes this capability as how a county facilitates implementing

recovery strategies. This is where recovery resources, grants and other funding are

coordinated and leveraged to build resilience.

The NIST (2015b) recommends counties establish a governing structure pre-

disaster to quickly begin the recovery process post-disaster. FEMA (2015a) describes

three recovery coordinating structures a county can decide to use. A Task Force consists

of recovery stakeholders and experts that usually focus on one recovery project. A

Recovery Committee is usually a temporary structure used to select strategic objectives

and oversee the recovery process. The last example structure, the Recovery Support

Function is based on using existing county departments and offices as well as Non-

Governmental Organizations and private sector resources organized similar to how the

Federal Governments aligns resources.

       Public Information and Warning. FEMA (2016d) describes the capability as

promoting mitigation strategies and priorities pre-disaster to persuade citizens and

businesses to support building a resilient county. FEMA (2016i) describes the capability

as a platform for messaging recovery information to the citizens and businesses of a

county. Messages provided need to be clear, accurate, and communicated in formats

available to everyone in the county.

Protection Core Capabilities

       FEMA (2016f) reported that despite selected as the fifth most important core

capability and increased investments, the Cybersecurity core capability was rated last in

preparedness for 2015. Another Protection core capability, Supply Chain Integrity and

Security was also rated as not strong or resilient during 2015. Improving both core

capabilities improves the resiliency of a county.

       Cybersecurity. The NIST (2017) released guidance in its draft Framework for

Improving Critical Infrastructure Cybersecurity which provides several approaches a

county could use for cybersecurity. The Framework offers industry standards, guidelines,

and best practices used daily in industry. The Framework promotes cybersecurity as a

component of the business risk management model for organizations. Counties are

recommended to select and use the standards and best practices that meets their

cybersecurity needs to protect both the county government and the provide guidance for the business networks.

The National Council of Information Sharing and Analysis Centers (ISACs) (2016) can help counties to reduce cyber risks and build resiliency. There are 24 ISACs that conduct analysis of cyber threats and disseminate information to members. The ISACs represent emergency management, homeland security, the industrial base, numerous infrastructure systems, and the financial sector.

During congressional testimony, Grief (2016) provided examples of the importance of cybersecurity to local government emergency operations and communications systems. Grief stated that two of the critical communications systems for local emergency response are the emergency 9-1-1 call system and the Computer Aided Dispatch (CAD). The 9-1-1 system receives information and calls for assistance from the public. The CAD is used by responder organizations to assign resources to respond to an incident. Robocalls, malware, spyware, and other forms of hacking have been used to disrupt local systems.

The state of Pennsylvania provides a website with cybersecurity information for city and county governments, businesses, organizations, and individuals to use to inform them of available cybersecurity tools. The state also provides links to an ISAC and a state of Pennsylvania sub-ISAC. The site provides cybersecurity information targeted for the needs of the state (Pennsylvania Office of Administration, 2016). Counties should consider providing similar cybersecurity information and links on their websites.

Supply Chain Integrity and Security. The U.S. Resilience Project (2011) recommended counties support the private sector supply chain industry to improve their

ability to respond and recover to a disaster. The recommendations to county

governments were:

- Establish two-way communications channels with industry;

- Provide security for industry response and recovery resources;

- Support industry to access impacted areas;

- Support industry requirement for fuel and other forms of energy;

- Support industry access to transportation networks; and

- Remove regulations that impede moving people and goods.

Rodin (2014) described an example of the supply chain after Superstorm Sandy

counties can use to inform pre-disaster analysis of their supply chain systems. After

Superstorm Sandy, one of the rebuilding projects was to improve the flood protection for

the Hunts Point peninsula on which the Hunts Point Food Distribution Center is located.

Protecting this facility is critical because it provides significant amount of the meat, fish,

and 60 percent of the fresh produce to the New York City region. The changes made not

only improved flood protection but also provided redundant and flexible transportation

options that are now available during a crisis.

Palin (2017) provides a report on the ability of the grocery supply chain to support

post-disaster provision of groceries to an impacted area. The research study conducted

by the Center for Naval Analyses determined the grocery supply chain maintains

sufficient non-perishable stock to become a major partner for feeding disaster survivors.

The study found resilient supply chains are critical for densely populated counties since

replacing the grocery distribution and retail services through other sources is nearly

impossible. The projected inability of the supply chain to transport groceries from

distribution warehouses to the grocery retailers in the impacted area is identified as a concern though.

Recovery Mission Area

FEMA (2016i) recommends counties integrate mitigation priorities for risk reduction with the pre-disaster recovery plan. Pre-disaster recovery planning leverages whole community partnerships to plan how to build resilience. To recover from the threats and hazards the county plans for counties need to develop Recovery core capabilities, plans, and coordinating structures that increase resiliency. Improving the Recovery core capabilities can build a resilience dividend for the county.

Economic Recovery. Istrate, Kavita, and Nowakowski (2014) advocates that the foundation of the resiliency of a county is the stability and vitality of its economy. FEMA (2016f) reports between 2012 and 2015 the Economic Recovery core capability was rated as decreasing in preparedness and many states projected a continued decline. FEMA (2016c) recommends indicators of resiliency for this core capability include the employment opportunity, the income level, and the tax-base cash flow for the county.

Developing a resilient economy requires a county to collaborate and work with public and private stakeholders and partners. The jobs provided within the county by the private sector is what is critically important for the county recovery (Istrate, Kavita, and Nowakowski, 2014). The NIST (2015b) advocates a county focus resiliency efforts for businesses that provide essential goods and services such as groceries and pharmacies; stores like Lowes and Home Depot; bank automatic teller machines; and gas stations. Priority for resilience investments for businesses should consider how tolerant the businesses and residents are such as how quick they expect each business to reopen.

Rodin (2014) recommends counties promote investing in resilience to their businesses. A county that is resilient can better compete with other counties having greater vulnerabilities for economic development and job creation. For pre-disaster preparations of the Economic Recovery core capability FEMA (2016i) recommends counties build the capacity for sustaining or rebuilding businesses and retaining the employment of the county residents. Mitigation strategies can focus on reducing risks for the private sector and build economic resilience.

Istrate, Kavita, and Nowakowski (2014) recommend the local chamber of commerce or other business associations are valuable partners for planning and building resilience for a county. To promote resilient development, many counties provide financial assistance to small businesses through state and federal loan programs or providing loans from the county leveraging county, state, or private funding. NACo reported that small counties with populations less than 50,000 primarily coordinates economic resilience through sub-state regional development organizations and the local chamber of commerce. Medium-sized counties with populations between 50,000 to 500,000 primarily coordinated with cities inside the county, but also coordinated with sub-state regional economic development organizations and the local chamber of commerce for building economic resilience. Large counties with populations more than 500,000 primarily coordinated with the cities in the county and with the state for building economic resilience.

Infrastructure Systems. FEMA (2016c) recommends indicators of resiliency for this core capability include road conditions and the availability of public transportation. Other indicators include reliable transportation systems, energy networks,

telecommunication networks, a resilient water service, and if relevant the stability of dams in the county. An advanced capability is the ability to monitor the system interdependencies and initiate actions to mitigate or prevent cascading problems for interrelated systems. FEMA (2016f) report that states assessed the Infrastructure Systems core capability at great risk for continued decline in preparedness.

FEMA (2016i) recommends pre-disaster preparations for the Recovery core capability, Infrastructure Systems include the support of the private sector critical infrastructure owners. Counties need to promote mitigating risks and building in resiliency. Retrofitting resilience upgrades to buildings may not be an option as increasing resilience of infrastructure systems often require re-engineering. The NIST (2015a) also promotes counties consider administrative options such as mutual aid agreements for response and land-use zoning for mitigating resiliency. Administrative options are less expensive and faster to implement than construction options.

Cauffman (2015) advocates counties determine their necessary functional requirements and then identify and analyze their private sector businesses and systems dependencies and interdependencies with the critical infrastructure that provide the necessary functions as described in Figure 4. The planning team assesses resilience gaps for critical infrastructure, identify and prioritize solutions, and develops and implements a strategy to increase resilience. Many infrastructure systems, such as electrical power is provided through sub-state regional cooperatives making it more difficult for a single county to directly influence the strategies for building resiliency (NIST, 2015b).
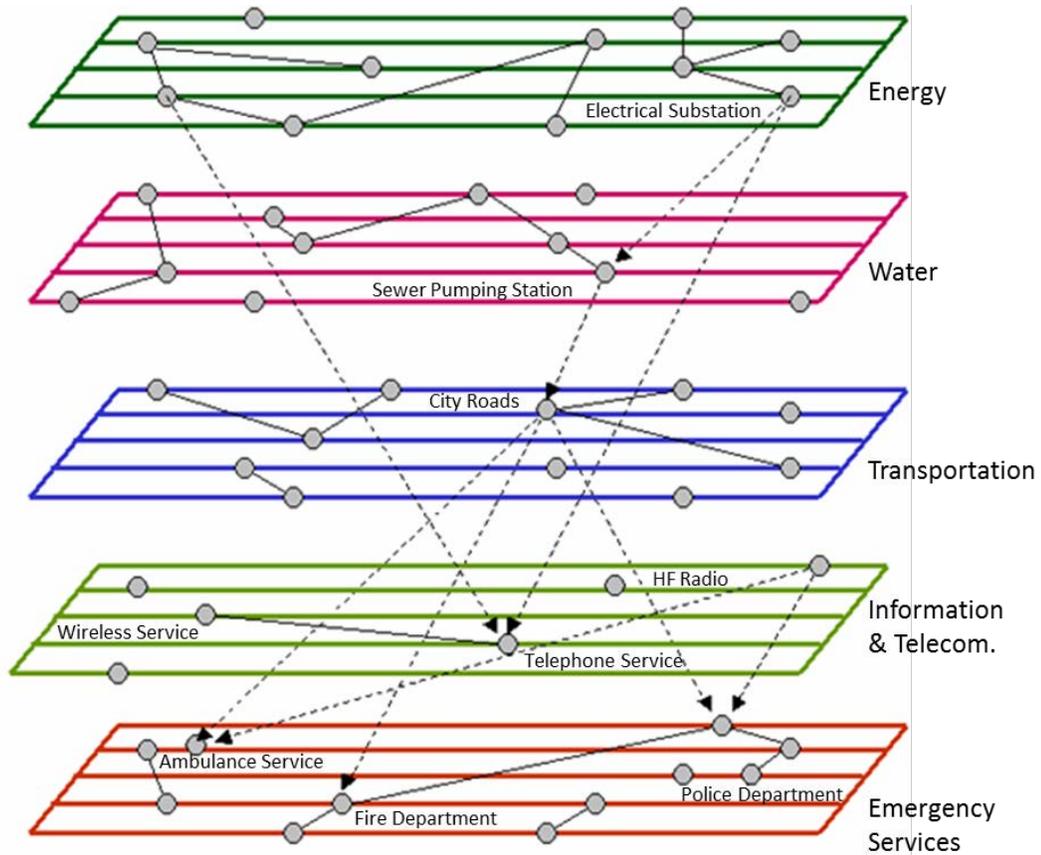
Solid lines that connect nodes within each service, as indicated by the lined boxes, represent internal dependencies. Dashed lines represent external dependencies between emergency services and supporting infrastructure systems. For instance, delivery of ambulance, fire, and police services all depend on telecommunications and roads.

Figure 4: Example of Infrastructure Dependencies (NIST, 2015b, pg. 41) (Source: Pederson, et al., 2006)

Rodin (2014) provides an example of addressing readiness and resiliency. The city of San Francisco formed the Lifelines Council to improve the rapid restoration of basic public utilities and services damaged as the result of a disaster. The council includes city services representatives and private sector service providers as members of the council. The council informs the planning and preparedness for the restoration and reconstruction of the utilities and services and increasing resilience.

Housing. FEMA (2016i) recommends a county develop pre-disaster housing strategies for the Recovery core capability Housing. The housing strategies need to align with the county development plans. The housing strategies need to support available, affordable, and accessible temporary and permanent housing solutions. Pre-disaster planning for the compressed timeline needed to rebuild housing can speed the recovery and increase resiliency. FEMA (2016f) reports that over half of states reported low preparedness for the Housing core capability during 2015. FEMA (2016c) recommends indicators of resilience for this core capability be the condition of housing and the affordability of housing in the county.

Rodin (2014) provided an example of post-disaster temporary housing solution counties need to consider replicating. Rodin noted many of the owners of bed-and-breakfasts within the damaged area around Superstorm Sandy wanted to offer empty rooms at no charge to displaced families. At that time Airbnb, the web-based service for bed-and-breakfasts did not have the capability to support this request. Over-night Airbnb programmers modified their website adding the link–www.airbnb.com/sandy–to address this problem and to allow for free bookings. Airbnb assisted 1,400 owners of bed-and-breakfasts to offer excess rooms during the first couple of weeks after the impact of the storm. A county should canvas the local hospitality providers such as hotels, motels, and bed-and-breakfasts to pre-plan temporary housing support.

Health and Social Services. FEMA (2016i) recommends counties implement pre-disaster resilience-building strategies for the healthcare system and for the social services networks for this core capability. A resilient healthcare system that can keep hospitals, doctor's offices, renal-dialysis centers, and child day-care centers open is vital

for the citizens of a county. Pre-disaster assessments can identify potential capability

gaps and inform the development of strategies to build resiliency for the healthcare

system

Chandra, et al., (2011) proposed what is described as levers that a county can use

to build community health resilience. The first lever is wellness, or preventive health

such as providing appropriate vaccinations. The second lever is to prepare for providing

access to healthcare during and after the disaster. Healthcare promotion is the third lever

of resilience. The fourth lever is to integrate citizen participation into resilience planning.

Building partnerships with the county government and volunteer organizations is the fifth

lever. The sixth lever is self-sufficiency which includes:

- Individual and family preparedness;

- The county to provide incentives for resilience;

- The support of citizen response, or spontaneous responders; and,

- Individuals and families prepared for 72 hours and the community for two weeks.

FEMA (2016c) recommends a county use the availability of healthcare, citizen

health lifestyles, and environmental qualities as indicators of resilience for this core

capability. Chandra, et al., (2011) recommend as indicators to also consider income and

disability status; access to health insurance and medical providers; the ability to

communicate medical concerns with non-English speaking individuals; identified at-risk

individuals and the level of social connection in disaster and resiliency planning; the

membership of the Local Emergency Planning Committee and integration of volunteer

organizations in planning; and finally the level of individual and family preparedness.

Natural and Cultural Resources. FEMA (2106i) recommends counties

integrate the expertise of stakeholders to identify and prioritize the resources needed to

mitigate and protect with pre-disaster resilience-building strategies, this Recovery core

capability. Plans and preparations to preserve and protect the environmental resources,

libraries, and archives, and historic sites should be made pre-disaster. The county can

build resiliency and often speed-up recovery by applying mitigating strategies pre-

disaster. FEMA (2015c) reports that states assessed the preparedness for accomplishing

this core capability continued to decrease since 2012. FEMA (2016c) proposed the

resilience indicators for this core capability include:

- Improving the supply of water through conservation;

- Conserving the wetlands and marshes;

- Conserving forests and woodlands;

- Healthy ecosystems in the county; and

- Protecting cultural resources.

Mitigation Mission Area

FEMA (2016d) states mitigation strategies are applied through the Recovery core

capabilities. Both the Mitigation and Recovery mission areas focus on improving the

resiliency of the economy, infrastructure, health and social systems, housing, and

resources from nature and our culture. Integrating mitigation into recovery planning and

preparations can stop the pattern of repeat damages from disasters.

Threats and Hazards Identification. FEMA (2016d) advocates this mitigation

core capability collect strategic hazard data from multiple sources relevant for both the

county government, residents, and businesses. Counties are recommended to translate

the analyzed data for use by the public. FEMA (2016c) advocate that an indicator a

county is accomplishing this core capability is consistently identifying the risks needed to

develop mitigation and resilience strategies for.

      Risk Disaster Resilience Assessment. FEMA states this core capability

calculates risk and revises assessments of risk. Assessments are needed for both the

social and the structural vulnerabilities in the county. There is value for counties to train

businesses and organizations how to conduct their own risk assessment (FEMA, 2016d).

The mitigation and resiliency-building projects completed by homeowners, businesses,

and county government based on the risk assessments ultimately are the indicators for

this core capability (FEMA, 2016c). Possible losses identified in the risk assessment

informs the development of the mitigation strategy and resilience plan (FEMA, 2013b).

      Risk Assessments. FEMA (2013a) released the CPG-201 describing a risk

assessment process a county can use to align their specific threats and hazards and

establish targets for each core capability. An outcome of the Threat Hazard Identification

Risk Assessment (THIRA) is an estimate of the capability resources the county needs for

each core capability. The county then decides on either investing in mitigation strategies

to reduce the risk that created the resource requirement, accepting the risk, or either

acquiring the resource or pursuing mutual aid agreements for resources.

      Counties are recommended to use the Hazard Identification Risk Assessment

(HIRA) to inform the development of their THIRA (FEMA, 2013a). Counties that also

consider the THIRA when they update their mitigation strategy can assess additional

capabilities to prevent, protect, respond and recover in addition to mitigate (FEMA,

2013b). A THIRA adds all types of threats and hazards to the HIRA to inform the

development of mitigation priorities for all threats and hazards (FEMA, 2013a).

By aggressively mitigating risks and hazards, a resilient county becomes more

self-sufficient and increases the ability to sustain services and functions expected by

citizens and the private sector. Through managing risk, a county can improve resiliency.

Leaders manage risks by deciding to avoid, mitigate, transfer and decrease vulnerability

for the long-term in order to build community resilience. County leaders also can decide

to accept risks (FEMA, 2016d). A representation of a disaster risk model is displayed in

Figure 5 (FEMA, 2013b).

Figure 5: Disaster Risk Model (FEMA, 2013b, pg. 5-1)

Long-Term Vulnerability Reduction. FEMA (2016d) advocates that this

mitigation core capability helps a county increase resiliency. Resilient counties use

appropriate building codes, land-use zoning and promote resilience building through the

use of incentives. The NIST (2015b) states that small improvements to buildings can

significantly improve resilience. It is important for a county to have appropriate building

codes and standards for construction, but the enforcement of codes and standards is how

resilience is actually established and improved. Counties need to have well-trained staff who can review designs and conduct inspections to ensure compliance with the county requirements and the approved plan.

The NIST (2015b) advocates that new construction standards and codes are developed from best practices and accepted design practices when issued. Even though standards and codes evolve and change, counties rarely mandate the owners of buildings and infrastructure retrofit due to the cost. Counties evaluate resiliency of new construction during the design planning. When the desired goals are revised counties review and evaluate their current codes and standards and decide if changes are needed to meet the new resiliency goals. FEMA (2016f) reports the International Code Council released stronger building codes in 2015 that included:

- Schools and emergency facilities in areas at risk of an F-5 tornado are now required to have a safe-room.

- New homes in high risk flood zones are now required to be built one-foot above the base flood level.

FEMA (2016c) proposes that enforcement of codes and standards, investing in mitigation and resiliency-building projects, obtaining incentives for the county, and giving incentives from a county can improve resiliency. FEMA (2013b) advocates in addition to codes and zoning, counties can establish ordnances or mandate resilience building actions. Counties can promote resilience-building preparedness through implementing the StormReady © and the Firewise Communities programs.

At the individual and community level, promoting individual and family plans and risk-appropriate insurance is important. Homeowner Associations (HOA) can be

used as resilience building force multipliers (FEMA, 2016d). Counties that use the

StormReady © preparedness actions increase resiliency. The StormReady © actions

include:

- Having a county emergency operations center;

- Possessing multiple ways to receive weather reports and to send alerts;

- Having a network of local weather spotters;

- Promoting preparedness;

- A plan that includes training and exercises for hazardous weather (FEMA,
  2013b).

Community Resilience. FEMA (2016d) describes this mitigation core capability

as beginning with an understanding of what is normal for a county. Next, the county

evaluates the risks and impacts facing the residents, the economy, and the environment.

Applying mitigation strategies developed, the county can promote resilience building

measures. FEMA (2016c) proposes social connectedness and developing collaborative

networks that meet the needs of the citizens of the county are indicators of accomplishing

this core capability.

FEMA (2016i) recommends counties promote individuals and families to become

resilient so they can better recover from a disaster. The NDRF promotes planning and

preparing for either an evacuation or sheltering-in-place for all members of the family to

include children, pets, and the elderly. The NDRF promotes purchasing property

insurance as appropriate for both hazard and flood to mitigate losses and speed recovery.

Table 8 provides a list of foundational preparedness actions that individuals and families

can do to increase their resilience (FEMA, 2016d).

> Possible individual, family, and household efforts to increase their resilience may include:
>
> - Preparing an emergency supply kit and household emergency plans and practicing what to do in an emergency.
>
> - Maintaining appropriate insurance coverage.
>
> - Ensuring that a tornado safe room or shelter is quickly and easily accessible.
>
> - Routinely removing pine needles from the roof and gutters to reduce the likelihood of a home catching fire from wildfire embers and creating a space free of ignitable vegetation around the home.
>
> - Ensure family members are vaccinated as medically appropriate.
>
> - Installing a home generator.
>
> - Elevating heat pumps, water heaters, and air conditioners high enough to stay dry during a flood event.

Table 8: Individual and Household Resilience (FEMA, 2016d, p. 55)

In addition to improving security, FEMA (2013b) advocates homeowner associations and other neighborhood groups as a key resource for a county to build and enhancing resilience to a disaster. Rodin (2014) advocates counties form neighborhood monitors and watch associations to help reduce crime and increase security. According to Docobo (2005), the Neighborhood Watch program has helped homeowners prevent crime for over 30 years.

Rodin (2014) notes individual and family resilience is usually greater when the community they live in has developed a strong social cohesion. The drive and desire to improve the preparedness and responsiveness of a community can come from social cohesion. Resiliency can be built through using neighborhood homeowner associations.

Rodin (2014) recommends a county increase resiliency by planning and preparing to use spontaneous responders during a disaster response and into the recovery. As an example, Rodin noted the spontaneous response of the Rockaway Beach Surf Club during the response and recovery from Superstorm Sandy. The club owners volunteered their clubhouse for use as a center for both the receipt and the distribution of relief

supplies. Approximately 5,000 volunteers from Brooklyn assisted by walking the

neighborhoods to assess need and then delivered the relief supplies to the needy at their

homes. Additional volunteers cleared storm surge debris from the streets allowing the

movement of response and restoration resources. Other volunteers also helped

homeowners to clear surge debris and clean seawater and sewage from homes.

Incentives

A county that enforces the standards and invests to fund the strategies and policies

set from the hazard mitigation plan builds resilience (FEMA, 2013b). To meet the targets

established, a county should consider both acquiring incentives to finance projects and

for the county to provide incentives to homeowners, property owners, and businesses for

their resiliency-building actions. The NIST (2015b) recommend offering incentives for

resilient retrofitting of older buildings to meet strategic resilience goals. FEMA (2016c)

recommends using incentives to encourage owners or developers to exceed the design-

based standards to build resiliency. The NIBS (2015) advises counties to prevent

disincentives for resilience investments such as triggering a property tax increase due to

increased property value.

The NIBS (2015) provides several recommendations a county ought to consider

to provide incentives for mitigation projects. A county can advocate for insurance

premium reductions and mortgage reductions. A county can also consider providing tax

reductions to residents for other resiliency-building actions. A county can provide

similar incentives for businesses and facilitate their access to grants. Counties should

also advocate for small businesses to consider low interest loans from the Small Business

Administration for pre-disaster retrofits to improve resiliency. Counties can promote

resiliency improvement for large companies to increase their bond ratings. Counties

ought to work with business and real estate developers to design-in resiliency, and

consider incentives for this. When working with utility providers counties need to

consider authorizing a small rate increase as an incentive for resiliency investments.

The NIBS (2015) recommend the political and executive leaders of a county

promote resiliency. Other incentives that a county could consider to reward resilience

investments are issuing permits faster or conducting inspections faster. Counties can also

consider using zoning requirements and waivers as an incentive for resiliency investment.

Reductions in tax assessments are another incentive a county has to promote resilience.

Insurance. When owners improve resiliency through a retrofit investment Stone

(2015) recommends a county provide tax credits for insurance. Rodin (2014) states many

people and businesses are underinsured by purchasing insurance policies with high

deductibles in order to have lower insurance premiums. When the insurance is needed

many people do not have the cash on hand or in savings needed for the deductibles.

Counties need to plan pre-disaster how to gain access to federal, state and private sector

post-disaster grants as a possible way to help cover the costs of deductibles.

Example of a State Resiliency Website. The first source of funding mitigation

actions a county has to consider is from the county operational budget. Every county

needs to have a reserve fund for emergencies or a disaster. Although it varies from state

to state, some funding such as grants are available for counties to apply for (FEMA,

2013). The state of Delaware has an excellent website for counties and cities to use to

find federal, state, and even private sources of funding for building resiliency (University

of Delaware (UDEL), 2014).

The UDEL (2014) developed a website for their counties and city governments to use for researching funding of projects to build, improve, and maintain community resilience. The university developed the website using a grant from the National Oceanic and Atmospheric Administration. The funding sources listed on the website include the Federal Government, the state of Delaware, and non-profit organizations. The potential funding sources for building resilience includes low interest loans, grants without matching funding, and grants requiring various amounts of matching funding.

Grants. FEMA has three grants provided annually a county may apply for a resiliency-building project through their state. The PDM grants are for building resiliency through mitigating risks. Counties may be eligible for mitigation funding for flood risk reduction through the Flood Mitigation Assistance grant. Another annual grant that can fund resiliency-building projects is the EMPG, but many small counties need this grant as the sole funding of their emergency management program. Other mitigation grants from FEMA are available to build-in mitigation during the rebuilding and recovery after a disaster (FEMA, 2013b). Kopan (2017) states the 2018 America First Budget proposes cutting the PDM grant for the Fiscal Year 2018 Federal budget since it was not previously authorized.

Community Rating System (CRS). Atreya and Kunreuther (2016) propose counties use the National Flood Insurance Program CRS. A county that uses the CRS can track improvements for resilience and inform areas for additional focus. Atreya and Kunreuther noted the CRS does not have a measure of social vulnerabilities, which is important for counties. Strategies counties can use to increase resiliency include:

- Promote the purchase of hazard and casualty insurance.

- Promote the purchase of flood insurance.

- Educate residents on the local hazards and threats and how to cope with disasters.

- Require the use of appropriate building codes.

- Stop repetitive flood losses through property buyouts.

- Support social connections in the county.

- Be aware of and prepared to augment the routine support for vulnerable populations.

Resilience-Force-Multipliers – Homeowner Associations

Fernandez, Barbera, and van Dorp (2006) advocate integrating spontaneous volunteers into disaster planning as force multipliers. Current volunteer structures do not adequately support the un-affiliated volunteer response. A system designed for managing spontaneous volunteers needs to be based on the Incident Command System.

FEMA (2016j) provides curriculum for communities to train Community Emergency Response Teams (CERT). These teams are volunteers from within communities that can directly respond to an incident in the community association or subdivision. Until a county responder arrives on the scene a CERT team member acts as the Incident Commander. CERT team members are trained in basic firefighting, simple triage and first aid, and light search and rescue. CERT team members can integrate and organize other spontaneous responders. In the U.S. there are more than 2,600 CERT teams.

Treese (2015) reported in 2015 there were 338,000 community associations within the U.S. The term community association includes HOAs, cooperatives, and

condominiums. Community association membership represented about 21 percent of the

U.S. population.

The Bollinger Hills HOA (2015) provide an example of a HOA based CERT

team. The volunteers come from residents within the subdivision trained in CERT

curriculum by the Danville and San Ramon, California first responders. The CERT

training is provided during three and half hour classes, one night per week for six weeks.

The Bollinger Hills HOA also participates in the shorter overview Personal Emergency

Preparedness (PEP) training sponsored by the state of California.

The City of Freemont (2017) also provides the three-hour PEP training. The class

is an overview of home disaster preparedness, fire safety, how to safeguard and turn-off

utilities, an overview of hazardous material, and an overview of weapons of mass

destruction. The PEP training meets the volunteer hours required for high school

students to graduate in California.

A Resilience Dividend

Counties that reduce the risks and hazard vulnerabilities by improving building

codes and zoning, providing incentives for owning a home, and successfully reducing the

insurance rates for flood insurance move toward a resilient county. Energizing the

county residents and businesses to plan together and execute a shared vision is critical for

building resilience. When a county invests in building resilience it is not only able to

respond and recover faster, it can gain new opportunities that would not be available

otherwise (Rodin, 2014).

The NIST (2015b) advocates for a county to promote the sense of belonging or

"social capital" to improve resiliency (p. 11). Rodin (2014) advocates a county promote

the sense of identity to the county and to the communities. Also recommended is the development of positive and factual messaging to promote the shared and unique identity. County residents are more likely to want to return to a county after a disaster when they feel a sense of social connection.

Rodin (2014) described resilience dividend using the impact of the storm surge from Superstorm Sandy on two separate stores in Brooklyn: IKEA and Fairway. Both stores experienced similar flooding surge. The IKEA building resilient design contributed to only minimal damage. FEMA actually used it as a relief distribution center for the community, which contributed to IKEA reaping goodwill or a resilience dividend for prior investment in resilience. The Fairway grocery store was in a much older building built in the 1800s and the flooding caused significant damage to both the building and to the inventory. Fairway was the only major grocery store in this community. It took Fairway four months to reopen, which delayed the recovery of the community. Fairway did not reap a resilience dividend.

Summary

There are over 3,100 county equivalents in the U.S. that often represent the foundational government for building and improving resilience. Federal guidance is not written for counties. The lack of basic core capability guidance for counties fails to increase their preparedness and resilience and collectively fails to increase preparedness and resilience for the Nation. With the appropriate guidance and support county equivalents can exponentially build and improve the security, protection, preparedness, and resiliency of the U.S.

The research confirmed the hypothesis. A county can use the Mitigation core capabilities from the National Preparedness Goal as a model for building resilience through pre-disaster planning and resourcing the Recovery core capabilities. The Mitigation core capability titles are a model for building residency. A county can identify and assess threats and hazards faced to develop resilience strategies, then build resilience to meet the Recovery targets through the Long-Term Vulnerability Reduction and the Community Resilience core capabilities striving toward a resilience dividend.

The best definition of resilience used by counties is resilience is multi-faceted. A single definition may not be necessary or beneficial. There are different mission area and many discipline specific definitions that a county needs to consider to meet the resilience strategies they developed. A county should not limit considering an action to meet a resilience target based on a definition, but instead think outside-the-box, especially searching for low-cost administrative solutions. A county needs to work toward building and improving resilience, to not simply withstand or tolerate disasters, but to be in a position to become better after the recovery than before the disaster.

Many of the core capabilities build-in resilience. A county that invests to improve the Prevention capabilities may build-in resilience to secure the county from terrorism. Investments in many of the Protection capabilities also build-in resilience to protect from the impacts of human-caused or natural disasters. The county may gain a similar result by additional investments to improve the Response capabilities to prepare to respond to all disasters. The result for the investments is improved capability and capacity to accomplish mission area tasks to secure, to protect, and to respond. The outcome of the

Prevention, Response, and most Protection capabilities are a required foundation for building resilience.

The core capabilities that add value for counties beyond to secure, protect, and prepare to respond can build resilience for a county. Many of the actions to build and improve resiliency are based on mitigation or protection actions for structural, natural, or social forms of resilience. A key component of community resilience is social cohesion, or the value of belonging to the community. Improving the core capabilities that build resilience can ultimately result in a county developing a resilience dividend.

The cross-cutting core capabilities that develop planning, the operational coordination structures, and public information and warning messaging build resilience when applied to accomplishing the resilience targets for the Recovery capabilities Infrastructure Systems, Economic Recovery, Health and Social Services, Housing, and Natural and Cultural Resources. The Protection capabilities Cybersecurity and Supply Chain Integrity and Security capabilities significantly support meeting the Recovery core capability targets and can build resiliency. The Mitigation capabilities Threats and Hazards Identification and Risk and Disaster Resilience Assessment when applied together inform the mitigation and resilience strategies accomplished through the Long-Term Vulnerability Reduction and the Community Resilience capabilities.

Recommendations

Federal Government. Preparedness grants should promote increasing the planning and coordination for resilience-building from the bottom-up, focusing at the county-level. All preparedness grants need to promote and support building resilience. Congress needs to authorize and appropriately fund Pre-Disaster Mitigation grants

specifically targeting U.S. counties to build and improve resiliency. The Federal Government ought to consider renaming preparedness grants to include the term resilience.

The Federal Government needs to develop a Resilience Handbook and Toolkit designed for counties. The handbook and toolkit should be designed by a representative workgroup of county resiliency planners. The workgroup would include more small and medium-sized counties than large counties. Sub-state regions should also be considered for membership. The format should be a short handbook with a supporting web-based toolkit that maintains the most current guidance for building resilience.

The handbook and toolkit should:

- Provide specific guidance counties need to consider when developing resilience strategies.

- Not be limited to a specific mission or discipline.

- Be current and relevant for use with grant applications.

- Consolidate resilience guidance from federal departments and agencies, and appropriate organizations and association guidance.

- Be in a simple format designed for county use, not to push or promote a political policy or program.

Counties. Counties needs to begin planning resilience-building with an understanding of what is normal for their social, natural, and structural systems and networks. Counties need to also understand the dependencies and interconnections their systems and networks have and build-in resilience to avoid cascading events. Counties need to consider their risk factors, assess their vulnerabilities and develop realistic

strategies to prevent, protect, and mitigate the risks. Administrative and construction options need to be considered.

A county should:

- Determine the indicators of resilience that they want to use to measure success.

- Acquire incentives to help fund resilience-building strategies.

- Promote appropriate types and levels of insurance as a resilience strategy.

- Coordinate with municipalities and organizations within the county to:

  o Provide and facilitate other incentives for homeowners and industry to meet the county resilience-building strategies.

  o Promote self-sufficiency as the critical foundation for building resiliency.

  o Work to meet CRS, Storm Ready ©, Firewise standards, or a combination of each.

  o Promote and lead the development of community association and homeowner association based spontaneous responders as resilience force multipliers.

  o Lead the instruction of a short CERT based overview similar to PEP.

  o Recruit training and building new CERT teams from the PEP alumni.

  o Promote building and improving the social cohesion beginning with community associations and homeowner associations.

  o Promote the resilience built as a marketable trait for the county.

  o Work toward building a resilience dividend.

Future Research. More research is needed to determine why no more than two possibilities were selected for the analysis of the core capabilities as increasing security,

resilience, or preparedness even though some of the core capabilities have elements of all three. Additional research is needed to determine if the finding has any impact on how counties should invest to improve either security, resilience, or preparedness.

Additional research should also include:

- What effect does the multi-faceted definition of resilience have for county resilience-building strategies and investments?

- Does the fact, or perception the primary resilience-building core capabilities are focused on hazard mitigation programs and long-term-recovery limit or detract counties from using the core capabilities to build resilience?

References

Atreya, A., & Kunreuther, H. (2016, July, 13). *Measuring community resilience: The role of the Community Rating System (CRS)*. Retrieved from http://opim.wharton.upenn.edu/risk/library/WP201607_Measuring-Community-Resilience-CRS.pdf

Bollinger Hills Homeowners Association. (2015). *Bollinger Hills community emergency response team*. Retrieved from http://www.bollingerhills.org/cert.htm

Cauffman, S. (2015, April 28). *Resilience: A national view* (PowerPoint slides). National Electrical Safety Code (NESC) Summit 2015, Institute of Electrical and Electronics Engineers (IEEE) Standards Association. Retrieved from https://standards.ieee.org/events/nesc/cauffman.pdf

Chandra, A., Acosta, J., Stern, S., Uscher-Pines, L., Williams, M.V., Yeung, D.,…Meredith, L.S. (2011). *Building community resilience to disasters: A way forward to enhance National Health Security* (RAND Corporation, TR-915-DHHS, 2010). Sponsored by the U.S. Department of Health and Human Services. Retrieved from http://www.rand.org/pubs/research_briefs/RB9574/index1.html

City of Freemont. (2017). *Personal emergency preparedness (PEP).* Retrieved from https://fremont.gov/102/PEP

Cutter, S. (2014, September 5). *The landscape of resilience measures* (PowerPoint slides). Resilient America Roundtable, Workshop on Measures of Community Resilience. Retrieved from http://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_152239.pdf

Desouza, K.C., Flanery, T., Alex, J., & Park, E. (2012, July 13). *Getting serious about*
  resilience in planning. Retrieved from https://www.planetizen.com/node/57827

Docobo, J. (2005, June). Community policing as the primary prevention strategy for
  homeland security at the local law enforcement level. *Homeland Security Affairs,*
  1 (4). Retrieved from: https://www.hsaj.org/articles/183

Eisenman, D., Chandra, A., Fogleman, S., Magana, A., Hendricks, A.,…Plough, A.
  (2014, August 19). The Los Angeles County Community Disaster Resilience
  Project — A community-level, public health initiative to build community
  disaster resilience. *International Journal of Environmental Research and Public*
  Health. Retrieved from
  http://www.cphd.ucla.edu/sites/default/files/downloads/Eisenman.CR_.pdf

Federal Emergency Management Agency. (2008, December). *National Incident*
  Management System. Retrieved from
  https://www.fema.gov/pdf/emergency/nims/NIMS_core.pdf

Federal Emergency Management Agency. (2013a, August). *Threat and Hazard*
  Identification and Risk Assessment Guide, *Comprehensive Preparedness Guide*
  201. Retrieved from
  https://www.fema.gov/media-library-
  data/8ca0a9e54dc8b037a55b402b2a269e94/CPG201_htirag_2nd_edition.pdf

Federal Emergency Management Agency. (2013b, March). *Local Mitigation Planning*
  Handbook. Retrieved from
  https://www.fema.gov/media-library-data/20130726-1910-25045-
  9160/fema_local_mitigation_handbook.pdf

Federal Emergency Management Agency. (2015a, February). *Effective Coordination of*

   Recovery Resources for State, Tribal, Territorial and Local Incidents. Retrieved

   from

   https://www.fema.gov/media-library-data/1423604728233-

   1d76a43cabf1209678054c0828bbe8b8/EffectiveCoordinationofRecoveryResourc

   esGuide020515vFNL.pdf

Federal Emergency Management Agency. (2015b, March 25). *Notice of funding*

   opportunity: 2015 Emergency management performance grant opportunity.

   Retrieved from

   https://www.fema.gov/media-library-data/1427284768817-

   b62b93d48b12617f423c0e8fbfde562b/FY2015EMPG_NOFO.pdf

Federal Emergency Management Agency. (2015c, September). *National Preparedness*

   Goal (2nd ed.). Retrieved from

   https://www.fema.gov/media-library-data/1443799615171-

   2aae90be55041740f97e8532fc680d40/National_Preparedness_Goal_2nd_Edition.

   pdf

Federal Emergency Management Agency. (2016a, August 17). *Communities can reduce*

   insurance costs through smart floodplain management. Retrieved from:

   https://www.fema.gov/communities-can-reduce-insurance-costs-through-smart-

   floodplain-management#

Federal Emergency Management Agency. (2016b, February 16). *Notice of funding*

   opportunity fiscal year 2016 Homeland Security Grant Program (HSGP).

   Retrieved from

https://www.fema.gov/media-library-data/1455569937218-

3daa3552913b8affe0c6b5bc3b448635/FY_2016_HSGP_NOFO_FINAL.pdf

Federal Emergency Management Agency. (2016c, June). *Draft Interagency Concept for*

Community Resilience Indicators and National-Level Measures published for

stakeholder comment. Retrieved from

http://www.fema.gov/media-library-data/1466085676217-

a14e229a461adfa574a5d03041a6297c/FEMA-CRI-Draft-Concept-Paper-

508_Jun_2016.pdf

Federal Emergency Management Agency. (2016d, June 16). *National Mitigation*

Framework (2nd ed.)*.* Retrieved from

https://www.fema.gov/national-mitigation-framework

Federal Emergency Management Agency. (2016e, June 16). *National Protection*

Framework (2nd ed.)*.* Retrieved from

https://www.fema.gov/national-protection-framework-0

Federal Emergency Management Agency. (2016f, March). *National Preparedness*

Report. Retrieved from

https://www.fema.gov/media-library-data/1476817353589-

987d6a58e2eb124ac6b19ef1f7c9a77d/2016NPR_508c_052716_1600_alla.pdf

Federal Emergency Management Agency. (2016g, June). *National Prevention*

Framework (2nd ed.)*.* Retrieved from

https://www.fema.gov/media-library-data/1466017209279-

83b72d5959787995794c0874095500b1/National_Prevention_Framework2nd.pdf

Federal Emergency Management Agency. (2016h, June). *National Response Framework*

(3rd ed.). Retrieved

from https://www.fema.gov/media-library-data/1466014682982-

9bcf8245ba4c60c120aa915abe74e15d/National_Response_Framework3rd.pdf

Federal Emergency Management Agency. (2016i, November 2). *National Disaster*

Recovery Framework (2nd ed.).

Retrieved from

https://www.fema.gov/national-disaster-recovery-framework

Federal Emergency Management Agency. (2016j, September 31). *Community emergency*

 response teams. Retrieved from

https://www.fema.gov/community-emergency-response-teams

Federal Emergency Management Agency. (2017, January 23). *Pre-Disaster Recovery*

Planning Guide for State Governments.

Retrieved from https://www.fema.gov/media-library-data/1485202780009-

db5c48b2774665e357100cc69a14da68/Pre-

DisasterRecoveryPlanningGuideforStateGovernments-1.pdf

Federal Insurance and Mitigation Administration. (2016). *FY 2016 Pre-Disaster*

Mitigation (PDM) Grant Program fact sheet. Retrieved from

https://www.fema.gov/media-library-data/1455711373912-

17d561db31cc299667dc5c60811165d1/FY16_PDM_Fact_Sheet.pdf

Fernandez, L., Barbera, J., & van Dorp, J. (2006, October 1). Spontaneous volunteer

response to disasters: The benefits and consequences of good intentions. *Journal*

of Emergency Management, 4 (5), September/October, 57-68. Retrieved from

https://www.hsaj.org/articles/684

Federal Insurance and Mitigation Administration. (2015, February 19). *Resilience and*

   climate change adaptation. Retrieved from

   https://www.fema.gov/media-library-data/1424368115734-

   86cfbaeb456f7c1d57a05d3e8e08a4bd/FINAL_ResilienceClimateChange_JobAid

   _19FEB15_508_Complete_.pdf

Fugate, C. (2015, April 22). Written testimony of FEMA Administrator Craig Fugate for

   a Senate Committee on Appropriations, Subcommittee on Homeland Security

   hearing to review FEMA's Fiscal Year 2016 funding request and budget

   justification. Retrieved from

   https://www.dhs.gov/news/2015/04/22/written-testimony-fema-administrator-

   senate-appropriations-subcommittee-homeland

Gilbert, S.W., Butry, D.T., Helgeson, J.F., & Chapman, R.E. (2015, December).

   Community Resilience Economic Decision Guide for Buildings and Infrastructure

   Systems (National Institute of Standards and Technology (NIST) Special

   Publication 1197). Retrieved from

   http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1197.pdf

Greif, S. (2016, April 7). Testimony before the Subcommittee on Cybersecurity,

   Infrastructure Protection & Security Technologies of the Committee on Homeland

   Security, U.S. House of Representatives. Cyber Preparedness and Response at the

   Local level. Retrieved from

   https://homeland.house.gov/wp-content/uploads/2016/03/Testimony-Greif.pdf

Holdeman, E. (2017, February 7). Defining Resilience: If I Were FEMA Administrator.

   Emergency Management Magazine. Retrieved from

http://www.govtech.com/em/disaster/Defining-Resilience-If-I-Were-FEMA-

Administrator-.html

Istrate E., Kavita M., & Nowakowski A. (2014, June 17). *Strong economies, resilient*

counties: The role of counties in economic development. Retrieved from National

Association of Counties website:

http://www.naco.org/sites/default/files/documents/FINAL_web_Econ%20Dvlp.0

7.02.14.pdf

Insurance Information Institute. (2016). *Twelve ways to lower your homeowners*

insurance costs. Retrieved from:

http://www.iii.org/article/twelve-ways-to-lower-your-homeowners-insurance-

costs

Kopan, T. (2017, March 16). *Here's what Trump's budget proposes to cut.* CNN Politics.

Retrieved from http://www.cnn.com/2017/03/16/politics/trump-budget-cuts/

Kousky, C. & Shabman, L.A. (2016, July 29). *The role of insurance in promoting*

resilience. Brink News. Retrieved from

http://www.brinknews.com/the-role-of-insurance-in-promoting-resilience/

Kunreuther, H., Michel-Kerjan, E., & Pauly, M. (2013, August). Making America More

Resilient toward Natural Disasters. *Environment Magazine,* 15-22. Wharton

School of Business. Retrieved from

http://opim.wharton.upenn.edu/risk/library/2013ENVmag_MakingAmericaMore

ResilienttoNatDisasters.pdf

National Association of Counties. (2016, February). *Counties matter*. Retrieved from

http://www.naco.org/sites/default/files/documents/CM2.0.pdf

National Council of Information Sharing and Analysis Centers (ISACs). (2016). *Member*

   ISACs. Retrieved from: http://www.isaccouncil.org/

National Institutes of Building Sciences. (2015, October 29). *Developing pre-disaster*

   resilience based on public and private incentivization. Retrieved from

   https://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/MMC/MMC_Resilience

   IncentivesWP.pdf

National Institute of Standards and Technology. (2015a, October). *Community*

   *Resilience Planning Guide for Buildings and Infrastructure System*s. U.S.

   Department of Commerce. Special Publication 1190, 1. Retrieved from

   http://www.nist.gov/el/resilience/upload/NIST_CRPG_Volume_1_032616_Comp

   lete.pdf

National Institute of Standards and Technology. (2015b, October). *Community Resilience*

   *Planning Guide for Buildings and Infrastructure System*s. U.S. Department of

   Commerce. Special Publication 1190, 2. Retrieved from

   http://www.nist.gov/el/resilience/upload/NIST_CRPG_Volume_2_032616_Comp

   lete.pdf

National Institute of Standards and Technology. (2017, January 10). *Framework for*

   Improving Critical Infrastructure Cybersecurity. Draft 1.1. Retrieved from

   https://www.nist.gov/sites/default/files/documents/2017/01/17/draft-

   cybersecurity-framework-v1.1.pdf

Palin P. (2017, January). *The role of groceries in response to catastrophes*. Centers for

Naval Analyses (CNA) Safety and Security Division. Retrieved from

https://www.cna.org/cna_files/pdf/Final-The-Role-of-Groceries-in-Response-to-

Catastrophe.pdf

Pennsylvania Office of Administration. (2016). *Cybersecurity for local government*.

Retrieved from:

http://www.oa.pa.gov/Programs/Information%20Technology/cybersecurity/localg

ov/Pages/default.aspx

Petkova, E.P., Schlegelmilch, J., Sury J., Chandler, T.E., Herrera, C.D., ...Redlener I.E..,

(2016, May 12). *The American preparedness project: Where the US public stands

in 2015.* National Center for Disaster Preparedness at Columbia University's

Earth Institute, Research Brief 2016, 2. Retrieved from:

https://academiccommons.columbia.edu/catalog/ac:198722

Rahman, J. (2014, January). *Resilient King County, white paper.* Retrieved from

http://www.kingcounty.gov/~/media/safety/prepare/documents/SpecialEvents/CE

OSummit_Resiliency/ResilientKCWhitePaper_Jan2014.ashx?la=en

Rodin, J. (2014, November 11). *The resilience dividend being strong in a world where

things go wrong*. Public Affairs, New York. ISBN 9781610394703

Stone, A. (2015, July 27). What is community resilience*? Emergency Management*.

Retrieved from http://www.emergencymgmt.com/disaster/What-Is-Community-

Resilience.html

Treese, C. (2015). *National statistical review for 2015 community association data.*

Retrieved from

http://www.cairf.org/research/factbook/2015_statistical_review.pdf

University of Delaware. (2014). *Delaware database for funding resilient communities.*

Retrieved from https://www.sppa.udel.edu/research-public-

service/ddfrc#Default=%7B%22k%22%3A%22%22%2C%22r%22%3A%5B%7

B%22n%22%3A%22owstaxIdDCPFundingAmountMetadata%22%2C%22t%22

%3A%5B%22string(%5C%22%230b89584fe-5971-40cd-9c10-

b88882d3a508%5C%22)%22%5D%2C%22o%22%3A%22and%22%2C%22k%2

2%3Afalse%2C%22m%22%3Anull%7D%5D%

U.S. Census Bureau. (2016). *USA counties, 2010 U.S. census*. Retrieved from

https://censtats.census.gov/usa/usainfo.shtml

U.S. Department of Health and Human Services. (2015, June 9). *Community resilience*.

Retrieved from

https://www.phe.gov/Preparedness/planning/abc/Pages/community-

resilience.aspx

U.S. Resiliency Project. (2011, October 31). *Priorities for America's preparedness: best

practice from the private sector*. Resiliency Roundtable Report. Georgetown

University School of Continuing Studies. Retrieved from

http://usresilienceproject.org/wp-content/uploads/2014/09/report-

Priorities_for_Americas_Preparedness.pdf

Yin, R. (2009). *Case study research: design and method.* (6th ed.). New York: Sage

Publications.

APPENDICES

Appendix A: LIST OF TABLES

TABLE   PAGE

Appendix B: List of Figures

FIGURE   PAGE